EFFECTIVE COST MANAGEMENT IN A MANUFACTURING ENTITY: THE CASE OF DELTA BEVERAGES (2011-2012)

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R9915522

DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS IN BUSINESS ADMINISTRATION

IN THE

GRADUATE SCHOOL OF MANAGEMENT

UNIVERSITY OF ZIMBABWE

SUPERVISOR: MR. CHIDAKWA

FEBRUARY 2013

Declaration

I, Norman Karidza, do hereby declare that this dissertation is a result of my own investigation and research, except to the extent indicated in the Acknowledgements, References and comments included in the body of the report, and that it has not been submitted in part or in full for any other degree to any other University or College.

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Student Signature **Date**

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Supervisor Signature **Name** **Date**

Acknowledgement

I would like to first of all thank the Almighty God for granting me spiritual and physical strength to undertake my whole project research.

I would also like to express my gratitude towards my wife, Preachhard, friends and family members for the unwavering support and contributions throughout the two and half years of my studies. A special mention also goes to my supervisor, Mr A. Chidakwa for his invaluable dedication and guidance. I benefited a lot from his vast knowledge and academic guidance that was conducted in a professional manner.

Not forgetting all the Delta Beverages lagers plant Harare employees who dedicated their precious time in completing the questionnaires and responding to interviews, for without their input, this study would not have been a success

Last but not least, my profound gratitude goes to the Graduate School of Management lecturers and staff for building the foundation for the research.

Be blessed all.

Abstract

This research evaluated the cost management procedures in the Manufacturing sector. The study explored the existing cost management methods at Delta Beverages Southerton plant and also the literature review relevant to the study. It was prompted by the trend in total cost of manufacturing, measured in dollars per hectolitre ($/HL) at the plant relative to other comparable breweries regionally. The main objectives in this case study were to verify impact of manufacturing way (MANWAY) in cost management, optimisation of spares availability, managing variable costs and overtime costs, sustainable development improvement opportunities and the use of IT in implementing effective cost management.

The study was both a qualitative and quantitative survey research method conducted on the case of Delta Beverages. Both the managerial and non-managerial employees made up the population for the study and were the recipients of the questionnaire. The main instruments used were the questionnaire and follow up interview questions. Primary and secondary data were used for analysis. The conclusions of the study were based on 66% response rate of the questionnaires.

The main results of the research were that there were some opportunities across the value chain which if utilised can help to effectively address cost management. The recommendations that can be implemented include urgent implementation of autonomous maintenance, full utilisation of COSWIN 7i, implementation of problem solving action plans, thorough supervision of contracted services, price negotiations in spares procurement, overtime reduction and use of IT services such as commitment accounting. The areas for further study were suggested as; to explore more on cost management in sales and marketing and also to benchmark with other performing breweries in the region so as to get an anatomy of their operations in relation to cost management, like the Mbeya and Nile breweries in Tanzania and Uganda respectively.

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CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.0 Introduction to the study

The research seeks to critically analyse the major cost drivers and way of implementing effective cost management measures for a manufacturing entity, with particular focus to Delta beverages Southerton Plant. The focus is on the value chain, that is, from the pre-production right through the manufacturing process to the post-production. These costs are mainly divided into fixed costs, depreciation, maintenance costs and variable costs, the aggregate of which is normally termed 'Total cost of Manufacturing' (TCM).

Literature on cost management relates to various organisational strategies that can be used to manage costs. The researcher is going to assess the applicability of such techniques to the case in point but most importantly recommend relevant techniques and strategies that can be implemented by Delta Beverages.

1.1 Background of the case study

Delta Beverages is a subsidiary of the Delta corporation group of companies in Zimbabwe, with the later partially owned by SABMiller group that also owns several breweries in all continents and is currently rated as the second largest brewery in the world. Delta Beverages' major plants in the country include;

- **Southerton Plant**-that manufacturers lager beers and canned soft drinks,
- **Graniteside plant**-specialising in the production of soft drinks (bottled and PET),
- **Belmont Plant**-manufacturing lager beers and bottled soft drinks,
- **Sorghum Plants**-specialising in opaque beer production,

These are diagrammatically shown on Figure 1.1

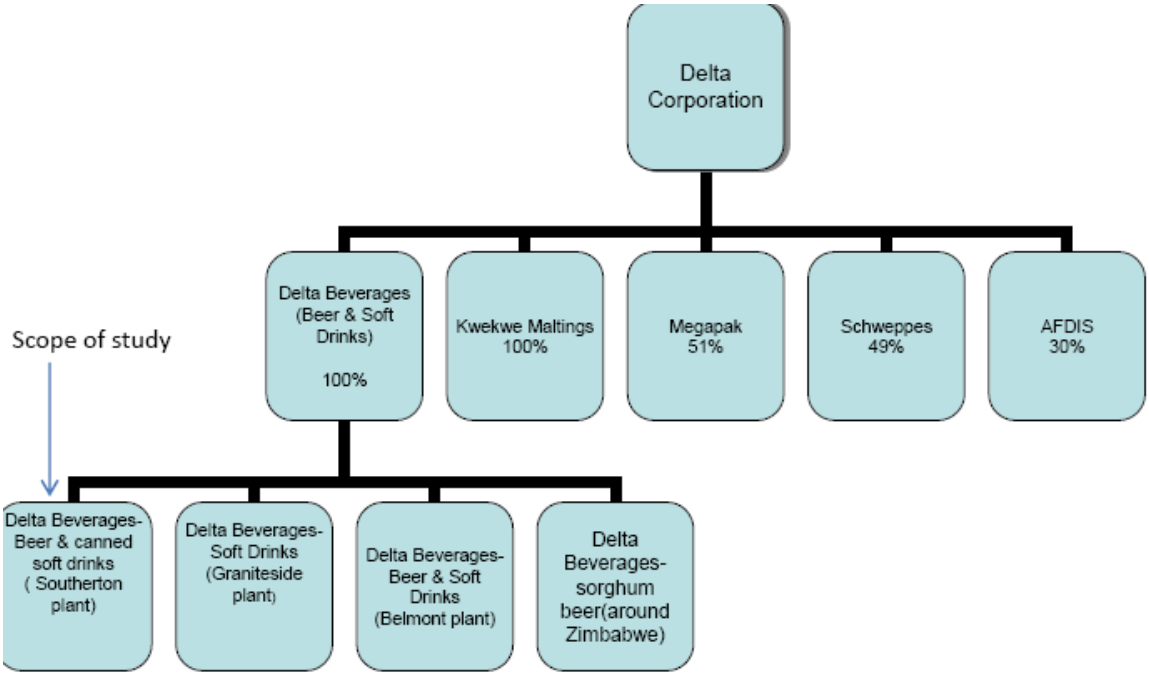


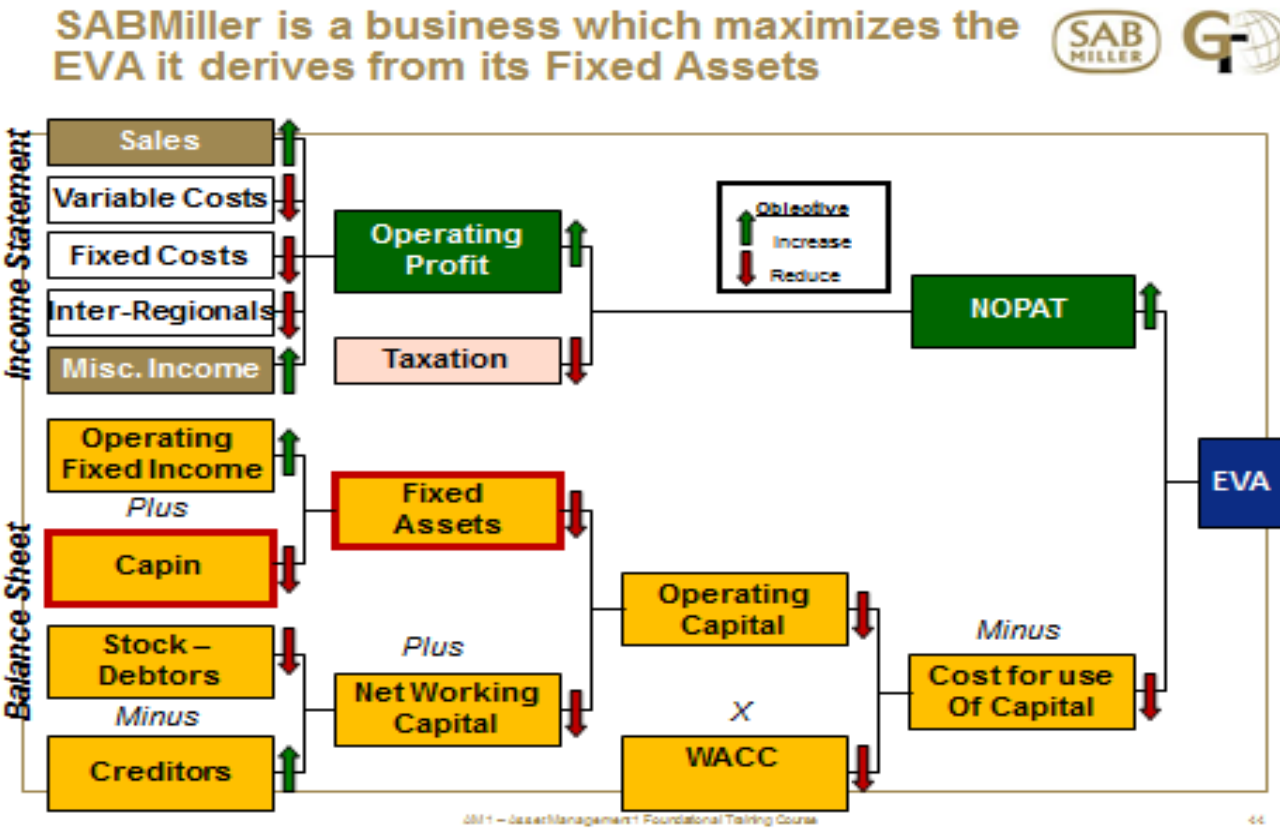
Figure 1.1: Case study focus area

The researcher is focusing on the Southerton plant. This plant manufacturers lager beer products under the Castle lager, Lion lager, Golden pilsner, Carling black label, Zambezi lite, Castle lite, Bohlingers and Eagle lager brand names. It is also into canning carbonated and non-carbonated soft drinks for Coca-Cola, Coca-Cola light, Fanta, Sparletta, Sprite and Schweppes brand names. In addition the company also markets, transports and distributes the finished product.

Delta Beverages Company incurs costs throughout the value chain from the supply of raw materials, production to the final distribution of the packaged product. These costs are categorised into variable, fixed, maintenance and depreciation costs, summed up as TCM. The background to the research is to find ways of managing these costs so as to improve the company's profits.

The global focus by the major Shareholder of the business, that is SABMiller, is to maximise economic value added (EVA) as shown on Figure 1.2. As indicated by the red arrows pointing downwards the target is to reduce on the variable and fixed

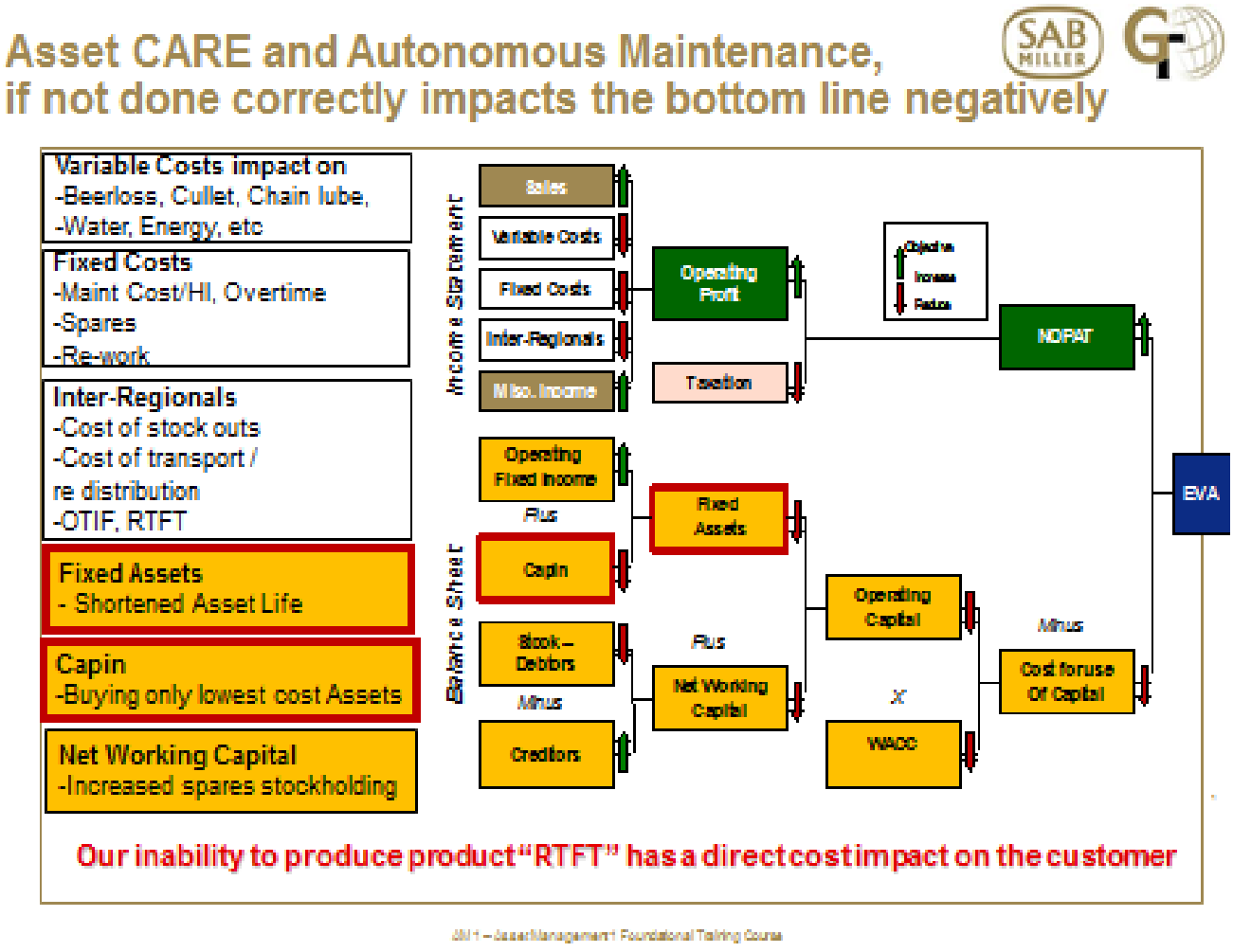
costs, at the same time maximising on sales (green arrows pointing upwards) so as to have a boost on the operating profit.



Source: TCM presentation by SABMiller Technical Team, 2012

Figure 1.2: EVA derivation from Fixed Assets

Figure 1.3 further shows a breakdown on the cost components such that the organisation does have an insight on the target areas to manage costs. As mentioned earlier on, these are some of the specific target areas which the researcher is going to focus on, in an endeavour to come up with effective cost management for Delta Beverages as a manufacturing entity.



Source: TCM presentation by SABMiller Technical Team, 2012

Figure 1.3: TCM components breakdown-impact of maintenance practises

1.2 Research Problem

The background to this research is the high values for TCM incurred since 2011 as opposed to comparable local and regional breweries, owned by SABMiller, such as Belmont, Graniteside, Nile in Uganda and Dar es Salaam in Tanzania. Table 1.1 depicts some of the differences in the TCM figures. As shown in the table, the current average figure for the organisation is $45.49/HL whereas Nile and Dar es Salaam have corresponding TCM figures of $30.94/HL and $37.13/HL respectively.

A difference of $1/hl estimates to a value of approximately $1.4million per year hence this has a significant bearing on the company's profit. This has prompted the researcher to critically analyse the cost drivers and coming up with solutions and recommendations for improvement.

Table 1.1: TCM comparison:

		TCM		
	Actual	Budget	Nile	Dar es salaam
Volumes	89,649	123,000	1,698,422	1,577,034
Total Maintenance cost	281,183	553,448	2,120,024	2,596,656
Maintenance cost per hl	3.14	4.50	1.25	1.65
Total other CFC	468,641	540,647	3,780,376	4,017,026
Total CFC per hl	5.23	4.40	2.23	2.55
Depreciation	88,400	132,432	4,056,000	3,625,525
Depreciation per hl	0.99	1.08	2.39	2.30
Variable costs	3,240,140	4,637,972	42,600,000	48,317,075
Variable costs per hl	36.14	37.71	25.08	30.64
Total	**45.49**	**47.68**	**30.94**	**37.13**

Adopted from Delta Beverages weekly financial report

These costs are distributed over a spectrum ranging from high prices of raw materials, spares (both locally and imported), contracted works costs, utilities costs (water, energy), maintenance costs, overtime costs, transportation costs among other various cost contributors. These affect the bottom line by reducing the company's Earnings before Interest and tax (EBIT) hence the net profits.

1.3 Research objectives

i. To assess the extent to which implementation of the 'Manufacturing Way', also known as MANWAY,can impact on cost reduction
ii. To carry out and assess the impact of sustainable development projects in order to optimise utilities costs such as energy and water
iii. To find ways of reducing on the costs of raw materials, spares and contracted costs
iv. To devise effective ways of managing payroll costs, for example, overtime costs.

1.4 Research questions

i. To what extent does MANWAY have an impact on cost management initiatives?
ii. What benefit can be obtained from sustainable development in terms of utilities costs reduction?
iii. How can variable costs incurred in raw materials procurement, spares and contracted works be reduced?
iv. How can overtime costs be managed?

1.5 Hypothesis

Null hypothesis is with effective cost management practises, it is possible to significantly reduce the TCM and improve on the EBIT.
Alternative hypothesis is that effective cost management practises have no direct impact on TCM hence EBIT

1.6 Scope

The research will be limited to Zimbabwe's manufacturing industry, with particular focus on Delta Beverages plant in Southerton industrial site. Performance data to be used will date back to two financial years. The site has been chosen since the researcher is based there hence data collection will be easier.

1.7 Justification

Delta Corporation has embarked on a capitalisation drive with a budget of $78m set aside for the CAPEX projects for the financial year of 2012, $22m having been allocated to the Southerton plant. The shareholder expects meaningful return on investment (ROI) after such investment in the company. Effective cost management ensures an improvement in the company's profit and getting a ROI. This will go a long way in solving management dilemma of high costs and get high EBIT, bearing in mind that an improvement by $1/HL results in an increase in profits by $1.4m per year since the Brewery has a yearly output of 1.4m HL of beer. The research will benefit operations, employees, stakeholders and shareholders since it will lead in overall business improvements and a consequential improvement in profit.

1.8 Ethical Issues

Ethical issues to be addressed in the research include the disclosure of Organisation's financial data and performance. This has been handled above board with the approval of executives on the foregoing research.

1.9 Dissertation Structure

Chapter one: This chapter provides the study background, problem statement, research objectives and questions, research proposition, scope of the research, ethical issues to be addressed and the justification of the study.

Chapter two: Review of previous literature has been covered. This includes theoretical and empirical literature on effective cost management techniques. It also covers critical analysis, that is, convergence and contradictions by previous authors who dwelt on the study on cost management.

Chapter three: Covers the methodology applied during the study. Justification of the methods and instruments used are detailed here.

Chapter four: Reviews the study results, analysis and discussion of the same is done with the aid of statistical tools.

Chapter five: Focuses on conclusions and policy and research related recommendations arising from the study.

1.10 Chapter Summary

The Chapter has covered an introduction to the dissertation topic, the background and justification of why the particular topic has been selected. It also looked at the objectives and some of the research questions that will guide the research. A proposition has also been put forward and that will be tested at the end of the dissertation. The chapter has also highlighted some of the ethical issues that have to be addressed in conducting the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

According to Neuman (2006), the purpose of a literature review is to learn from others and stimulate new ideas. This review tells what others have found so that the researcher can benefit from the effort of others. Neuman further postulates that a good review identifies blind alleys and suggests hypothesis for replication. Gill and Johnson (2003) supports this view by highlighting that literature review justifies any new research through a coherent critique of what has gone before and demonstrates why new research is both timely and important. The Chapter arrangement is summarised under the 'Literature Review Focus Concepts'.

2.1 Literature Review Focus Concepts

This chapter starts with a definition on manufacturing since the field is the focus area for the study. It then centres on the theoretical background to the study of cost management. Several concepts on the subject matter are explored. Some of these concepts include principles of effective cost management, cost management as a strategy, value stream, just in time (JIT) among other concepts. Literature in support of effective cost management, factors that influence cost management and its alignment to strategy is presented.

The concept of strategic cost management (SCM) is also discussed in detail, drilling into the concepts and pillars guiding the framework. Some of these pillars include the guiding principles of SCM, key concepts, objects of SCM, analysis fields and activities of SCM, instruments and key support factors of the framework. The concepts of cost drivers and value chains are discussed in detail, showing that managers need to understand how costs behave and what cost structure is to make informed decisions. Also to be discussed in detail are ways of identifying cost drivers and benefits thereof. To manage costs and make recommendations for improving the company's position and creating value for the customer, it requires not only

identifying and analysing cost drivers but also the value chain. Thus this chapter will focus also on the concept of value chain and discuss the principal stages of value chain analysis for strategic cost management.

The chapter also unveils product and process cost management, with the later focusing on two different levels of process improvement, that is, continual improvement and business process reengineering. From these levels, three major dimensions to manage cost, quality and time can be developed thus; business process adjustment, chaining business process by streamlining and moving the business process.

Key resources the company should focus on in order to manage strategic costs are also looked at. An understanding of how they are used in the value chain is ctirical. The relationship and implications of cost level and cost structure is analysed. Since overhead costs and fixed costs form a special problem in the field of cost management, an anatomy of overhead, fixed cost management and their instruments is done. Various cost management instruments discussed include activity based costing and management, target costing, life cycle costing and benchmarking. The thrust on all these is to look at the origins, stages, development, significance, objectives and applications.

In a nutshell, the chapter focused on the following major target areas for effective cost management.

- Value chain and Strategic cost management
- Balanced scorecard and Performance measurement
- Target costing
- Benchmarking and best practices
- Supply chain management and Logistics
- Total quality measurement
- Activity-based costing and activity-based management
- Process management
- Theory of constraints

- Advanced manufacturing techniques.

The areas highlighted are discussed in detail in the foregoing chapters and ends with a summary of the discussion on cost management.

2.2 Definition of Manufacturing

According to the business dictionary, manufacturing has been defined as 'The process of converting raw materials into finished products that meet the expectations of customers.

Some scholars also defined Manufacturing processes as the steps through which raw materials are transformed into a finished product. The manufacturing process begins with the creation of the materials from which the design is made. These materials are then modified through manufacturing processes to become the required part. The manufacturing process also includes tests and checks for quality assurance during or after the manufacturing, and planning the production process prior to manufacturing.

In the Macquarie Dictionary, manufacturing is defined as the making of goods or wares by manual labour or by machinery, especially on a large scale. The activity of manufacturing includes any activity that fits the definition of manufacturing, irrespective of whether the activity relates to private individuals, organisations whose principal business is not manufacturing (e.g. retailers), or organisations whose principal business is manufacturing. Excluded are any activities undertaken by these persons and organisations that do not fit the definition of manufacturing. Manufacturing covers a myriad of inputs, processes and products. It embraces production of thousands of different types of goods. Some of these range from ships to sugar to sheep shearing equipment, and from micro circuits to motor vehicles to medicines. The number and complexity of the processes involved in the production of these goods varies. The extent of transformation involved in these processes form the basis of a view of manufacturing which differs from the standard industry view.

To consider manufacturing as a whole we clearly have to look beyond specific sets of materials and processes that lead to single products. Viewing manufacturing as a system provides a way of identifying which factors, whether internal or external, are important, and so aid decision making about choosing a particular manufacturing process in a particular situation.

2.3 Cost Management

In the past, business organisation has been facing a change of business environments, such as increasing competition, forcing global firms to respond to these conditions with better management approach (Kumar and Shafabi, 2011). According to Zengin and Ada (2010), the competition forces manufacturing firms to create the operational effectiveness and maintain their profitability. Kumar and Shafabi (2011) further postulated that the most important managerial tool is cost management strategy and is considered as critical factor to increase revenue for the success companies. Ellram and Stanley (2008) indicated that a cost management strategy supports decision making and improves competitive advantage that results in a better resource allocation. In addition, cost management may be an integral feature of overall businesses' management effectiveness and facilitate to determine accurately estimated cost before process starting and can help to forecast cost occurrence in the future.A cost management strategy effectiveness helps to finish the task with the spending of limited allocated resources and makes valuable to firms such as working capital invested reduction, lower cost per unit, and better quality of the process and product (Groth and Kinney, 1994).

Anderson (2007) pointed out that cost management often refers to cost cutting and it is a common approach that firm managers use to respond to the decreasing sustainable profitability. A number of prior research studied cost management with respect to supply chains, value chain management, target cost, activity-based costing, just in time (JIT), and inter-organizational cost management (Agndal and Nilsson, 2009; Anderson 2007; Anderson and Dekker, 2009; Backstrom and Lind, 2005; Nicolaou, 2002; Cooper and Slagmulder, 2004). This approach above can be

merged to what was put across by Freeman (1996), when he highlighted that ‘since the emergence of activity based costing as a mainstream performance management tool in 1986, several cost management methods have been developed or documented by CAM-I and others. Among these advances are target costing, capacity management, process-based management and improved performance measurement and reward systems including the balanced scorecard. The components of an integrated cost planning and management are thus becoming visible as a result of these developments. Rather than an internally focused and tactical control system, effectively understanding and managing costs is increasingly being used by companies as a strategic weapon.

2.3.1 Cost Management definition

According to Buckingham and Loomba (2001), cost management is the process of planning, estimating, coordination, control and reporting of all cost-related aspects from project initiation to operation and maintenance and disposal. It involves identifying all the costs associated with a decision, making informed choices about the options that will deliver best value for money and managing those costs throughout the life of the project, including disposal. Such techniques as value management help to improve value and reduce costs.

According to Shank (1989), Cost management systems are important, but equally is knowing how and when to apply them to achieve long term success. They help managers understand cost structure and behaviour. Therefore, they can make decisions that will enable the organisation to achieve or exploit a strategic competitive advantage. In taking a strategic emphasis, cost management looks at the long term competitive success of the firm. Strategic cost management plays an important role in management functions especially strategic management. It can facilitate the developing and implementing of business strategy where the accountant is viewed as a business partner rather than a mere bookkeeper

The above analysis concurs with the views put across by George (2002), who indicated that the subject of cost management is more strategic than it is operational.

2.3.2 Effective Cost Management

According to Tanaka (1993), 'Cost management is like wringing out a wet towel. The biggest is obtained first, but we must keep wringing. Even when the towel appears dry to the touch, we must wring it to extract more'. To achieve this level of performance and success in strategic cost management requires the commitment of resources, the formulation and application of appropriate policies and procedures, and the establishment of objects, activities and instruments.

Robert (2006) emphasised that effective cost management is a process rather than a discipline. It requires processes and methodologies that can only function with information development, and knowledge hand-off and enhancements. This is made possible through deployment of assignment, collection, assessment, analysis and strategic decision making process. Cost management is a management function and responsibility, and must be performed by teams using recordable and repeatable methodologies.

He further on highlighted that effective cost management requires involvement and interaction between many individuals at different levels having different roles and skills (ibid). It demands that all persons employing management methodologies interact in a synergistic fashion. Cost management practice areas are too often compartmentalised and singularly tasked, allowing only minimal information exchange or knowledge enhancement between jobs.

Hamid and Hashim (2006) postulated that cost management is essential to manufacturing companies in order to maintain profitable sales to the company and sustainable position in current global market. An effective cost management will enhance a company competitiveness and survival of its business especially during a

global economic crisis. Practising continuous cost improvement activities had helped many companies to become more competitive and ability to survive.

According to George (2002), 'Effective cost management is the central measure of accountability for business leadership. It includes effective strategy implementation as well as providing the resources and process discipline to enable and ensure the highest possible level of reliability, quality, and productivity at the lowest overall cost. Cost management is the process of optimising performance. It is as much strategic as it is operational'.

Busa (2011) also said 'Effective product cost management requires systematic activities, processes throughout the enterprise to find the lowest possible costs'.

The researcher concurs with the sentiments postulated by the above authors since quite often; organisations have concentrated on cost management as a short term strategy and as such, they focus cost cutting measures which normally have long term negative consequences. Thus cost management is as much strategic as it is operational and effective business leadership is a prerequisite to drive such focus.

2.3.2.1 Principles for effective cost management

George (2012) further elaborated on the seven principles that he believes provide both a robust business model and the essence of a cost management ethos. These include; providing clear, consistent performance objectives, providing knowledge and tools to succeed, understanding true costs, achieving excellence, reducing organisational complexity, committing to broad based, knowledge driven involvement and clever management decisions that do not impact on the organisational cost.

2.3.3 Target costing

Freeman (1996) defined target costing as a management method that allows firms to provide customers with products that they want, at the right time and affordable prices but still earning adequate financial returns. It is strategic in nature and if done

properly, it promotes a culture of excellence in an organisation that provides continuing strategic advantage. Target costing is a systematic process of cost management and profit planning. Freeman (1996) indicated that there are six key principles of target costing namely;

Price-led costing.

Under this principle the market prices are used to determine the target costs. Target costs are calculated using a formula; market price - required profit margin.

Focus on customers.

The main features for customer requirements include quality, cost, and time so these should be included in product and process decisions and guide cost analysis. The value obtained must be greater than the cost of providing those features and functionality.

Focus on design.

The cost control at this phase is emphasized at the product and process design stage. This results in lower costs and reduced "time-to-market" for new products.

Cross-functional involvement.

The main involvement in target costing is done by the cross-functional product and process teams who are responsible for the entire product from initial concept through final production.

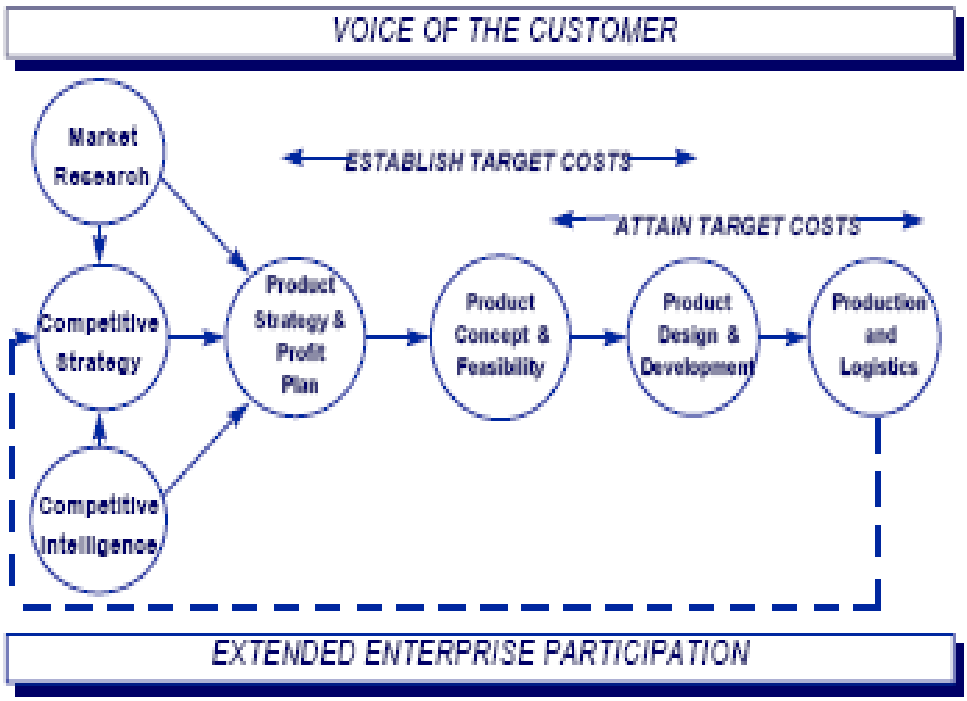
Value-chain involvement.

The value chain enablers which are the suppliers, distributors, service providers, and customers are involved in the process of target costing.

A life-cycle orientation.

Total life-cycle costs which includes purchase price, operating costs, maintenance, and distribution costs are minimised for both the producer and the customer

‘Target costing can also be defined as a disciplined process for determining and achieving a full-stream cost at which a proposed product with specified functionality, performance, and quality must be produced in order to generate the desired profitability at the product’s anticipated selling price over a specified period of time in the future’



Source: CAM-I Target Cost Core Group, S. Ansari and J. Bell

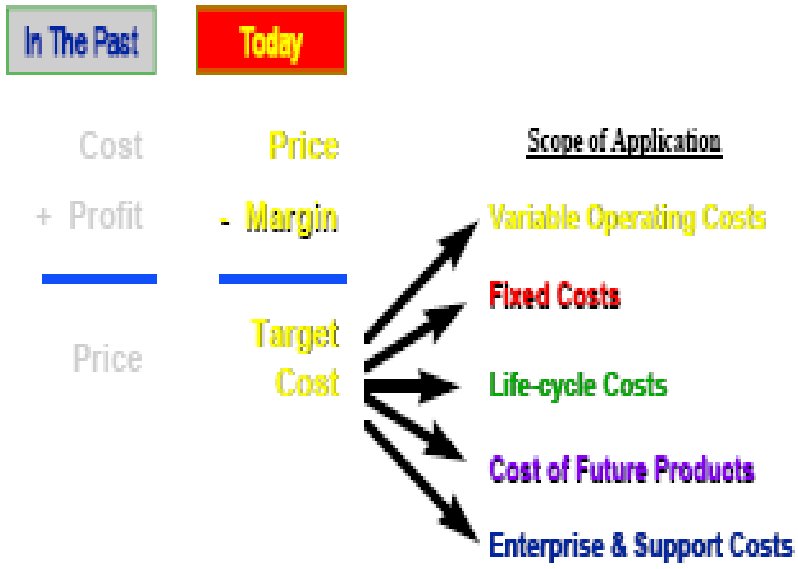
Figure 2.1: Target costing concept

Target costing process is based on understanding what features customers want in a product and what they are willing to pay for the features, what product features competitors are likely, and finally what life cycle cost must be attained to insure an adequate return. This is illustrated in Figure 2.1

2.3.3.1 Impact of target costing

Establishing and achieving target costs has a direct impact on the cost structure and performance of the value chain. The success of target costing process will depend to a large degree on the ability of the finance organisation to translate operating

performance into financial terms and assess the implications for future products and services. The strategic implications of target costing are far-fetched. The ability of firms to deliver products that customer's desire at a price they are willing to pay more quickly than their competitors will be the distinguishing characteristic of successful enterprises. Target costing ensures that firms who do this also attain a life cycle cost target that supports long term profitability (Freeman, 1996). Figure 2.2 depicts the impact of target costing



Source: John Dutton, Arthur Andersen, LLP; 1996.

Figure 2.2: Impact of target costing on cost management

2.4 Strategic Management Cost

According to Cooper and Slamguder (1998), strategic cost management is not limited to cost only but is inclusive of all resources used and deployed across the value chain. Therefore, it should not confine its concerns and objectives only to cost, but also consider revenue, productivity, customer value and strategic position of the

company. Figure 2.3 shows the objects and means by which strategic management can contribute to the process of cost improvement and revenue enhancement.

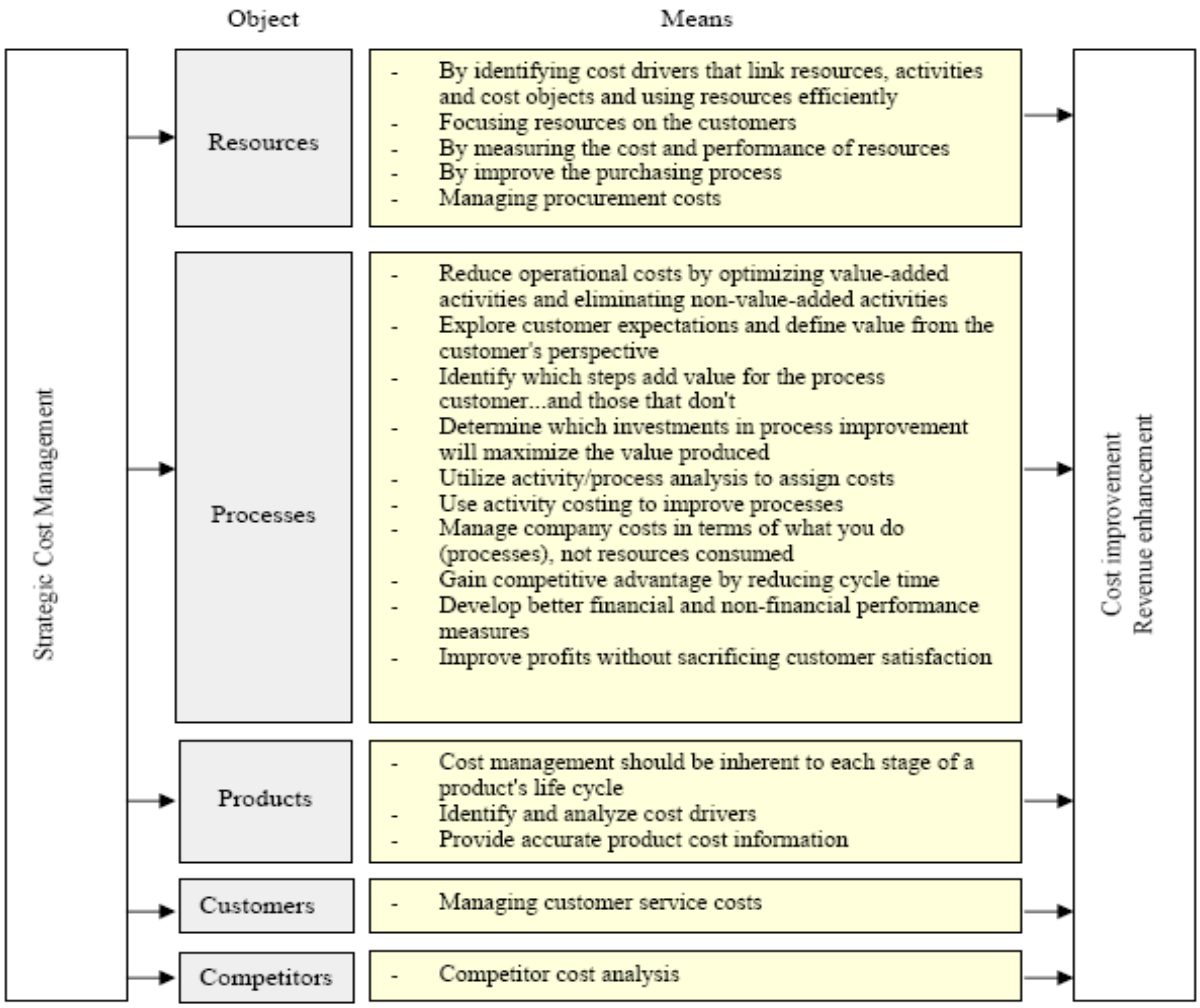


Figure 2.3: SCM-cost improvement and revenue enhancement (Horngren, 2000).

Horngren (2000) also argued that productivity is a key measurement for strategic cost management, measuring the relationship between actual inputs and actual outputs. Other authors have a broader view of productivity and understanding it as effectiveness, efficiency and economy. In strategic cost management, reducing costs alone is not productivity improvement. Many times, reducing cost in one activity can shift costs to anpther activity. Some examples of productivity increase include lead time decrease, product quality improvement, revenue increase,

overhead and operation expenses decrease, customer satisfaction and continuous improvement. Strategic cost management can play an important role as shown in Figure 2.4.

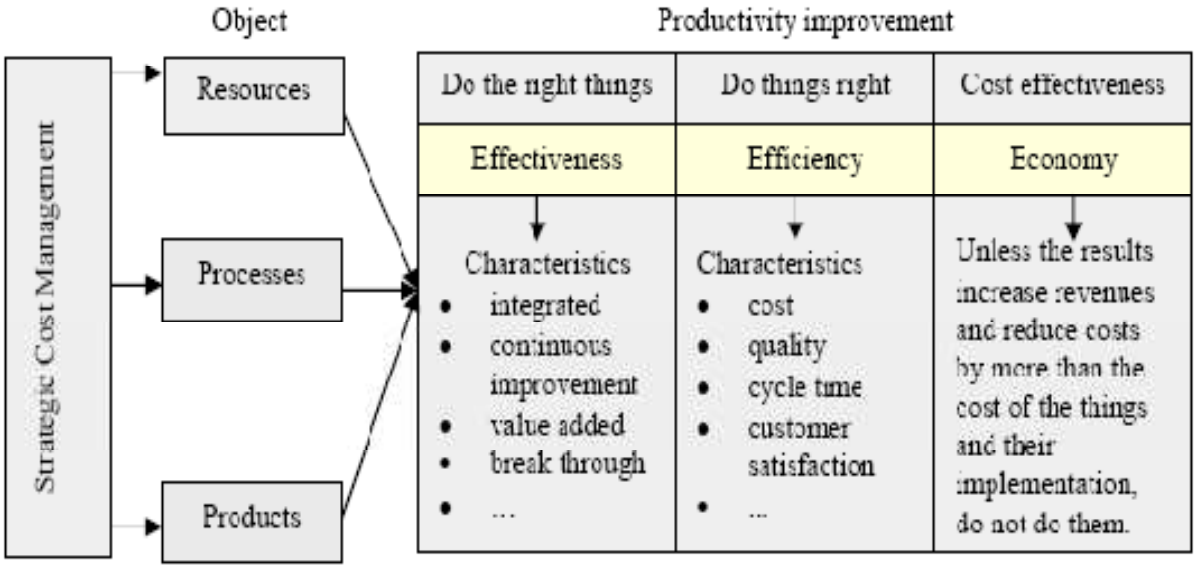


Figure 2.4: Strategic cost management and productivity improvement (Freeman, 1997)

2.4.1 Strategic management cost framework

Freeman (1997) postulated that in order for strategic cost management to achieve its objectives, Figure.2.5 shows a suggested framework. The theme for strategic cost management is supported by many sub-themes that are called “pillars”. The proposed pillars of the suggested framework for strategic cost management are:

- The guiding principles of strategic cost management;
- The key concepts of strategic cost management;
- The objects of strategic cost management;
- The analysis fields and activities of strategic cost management;
- The instruments of strategic cost management and

- The key support factors of the suggested framework

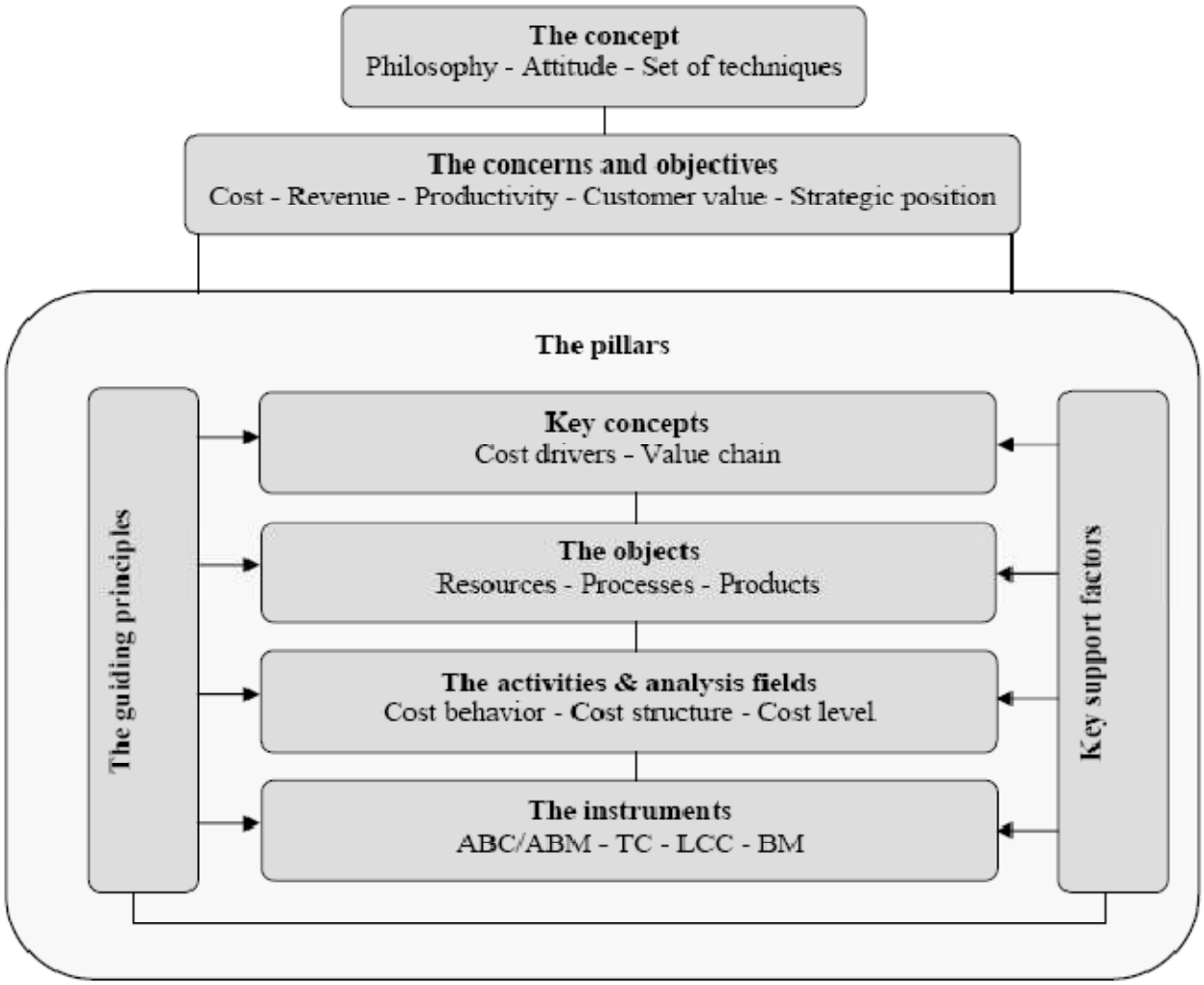
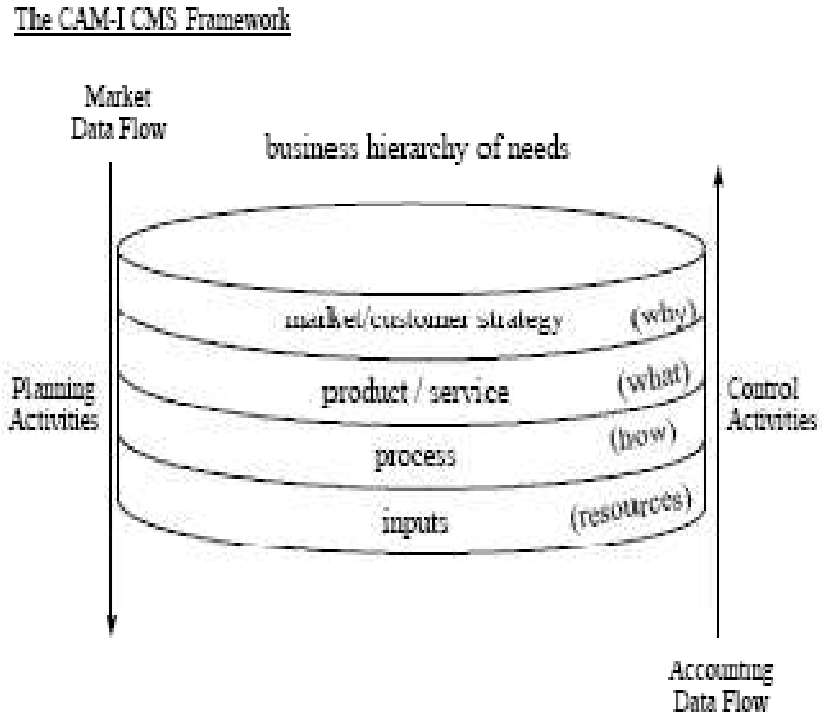


Figure 2.5: Strategic cost management framework (Freeman, 1997)

2.4.2 The Business Hierarchy

Freeman (1997) indicated that the first critical relationship that affects strategic cost management initiatives is the business hierarchy. This is shown in Figure 2.6 and explained in the subsequent chapters.



Source: Alan Vercio, Texas Instruments, 1995.

Figure 2.6: The Business Hierarchy

The layered model demonstrates the relationships that should guide the deployment of management strategy and initiatives. The top layer represents the introduction of the customer voice into the management process. The transition from this layer to the next is based on the ability to translate the voice of the customer into product capability requirements.

The second layer of the hierarchy is the product dimension. This represents the important 'what' decisions that must be addressed by business strategy this component, in combination with the customer voice represents the traditional business and market planning and management activities of the organisation. The ability to transition from this layer is based on the ability to translate product capability requirements into manufacturing process requirements.

The process layer of the model addresses 'how' work gets done in the organisation, specifically how the factors of production, that is, materials, labour, facilities and

innovation are converted into viable products and services that satisfy customer demands. This level of business hierarchy is synonymous with the traditional role of operations management in the organisation. The final transition point is the translation of manufacturing requirements into specific resource requirements.

The inputs or resource layer of the hierarchy is representative of the specific inputs that are required to execute the business strategy. The layer represents the development or acquisition of resource inputs that can be applied in the process layer with the greatest possible degree of productivity.

2.5 Activity-Based Support Systems

According to Freeman (1997), the use of cost management techniques as a strategic weapon is also based upon the availability of activity-based decision support systems. These techniques range from activity analysis at the basic level to fully integrated activity based costing and management systems that are supported by the organisation's operational and accounting software. The foundation of effective cost management strategy is an understanding of the organisation's activities and the associated costs and results. Further, the organisation must understand the activities that are performed by the suppliers and customers and the impacts on product and service effectiveness and profitability. A deeper understanding of the activities that impact the organisation and their resulting costs and benefits enables a wide range of analyses and evaluations. Improvement in the performance is usually accomplished through a critical evaluation of the trade-off between the benefits of performing an activity and the resultant cost.

Cost management activities are based upon one or more views of cost which have distinct levels of detail and different purposes (ibid). These are shown in Table 2.1. Strategic leverage can be achieved by developing analyses at both the strategic and operational levels of organisation. Traditional cost management activities have been based largely on the financial view.

By evaluating their performance on each of these levels, organisations are better to understand the impacts of strategy, customer and supplier behaviour, and internal process performance on their effectiveness and profitability.

Table 2.1: The three views of costs

View of Cost	Strategic	Operational	Financial
Users of Information	• Business/strategic planners • Sourcing groups • Capital budgeting • Cost engineers	• Front-line managers • Process improvement teams • Quality teams	• Financial controllers • Tax managers • Treasury • Tax authorities
Uses	• Activity-based product costing • Target costing • Make vs buy analysis • Investment justifications • Life cycle costing	• Key performance information • Value/non-value added identifiers • Manage daily activity	• Shareholder reporting • Inventory valuation • Preparation of tax reports • Lenders monitoring condition
Level of Aggregation	• Product line aggregation • Information detail based on type of decision	• Very detailed • Work unit level	• High • Often company-wide data • May be on legal entity basis
Reporting Frequency	• Ad hoc, as needed • Usually a special study	• Immediate • Possibly hourly or daily	• Periodic, usually monthly • Probably quarterly or annually if other needs were met
Type of Measures	• Combination of physical and financial	• Mostly physical	• Mostly financial
Time Focus	• Future	• Current	• Historical

Source: R. Steven Player, Arthur Andersen, L.L.P.

2.6 Costs Scoping

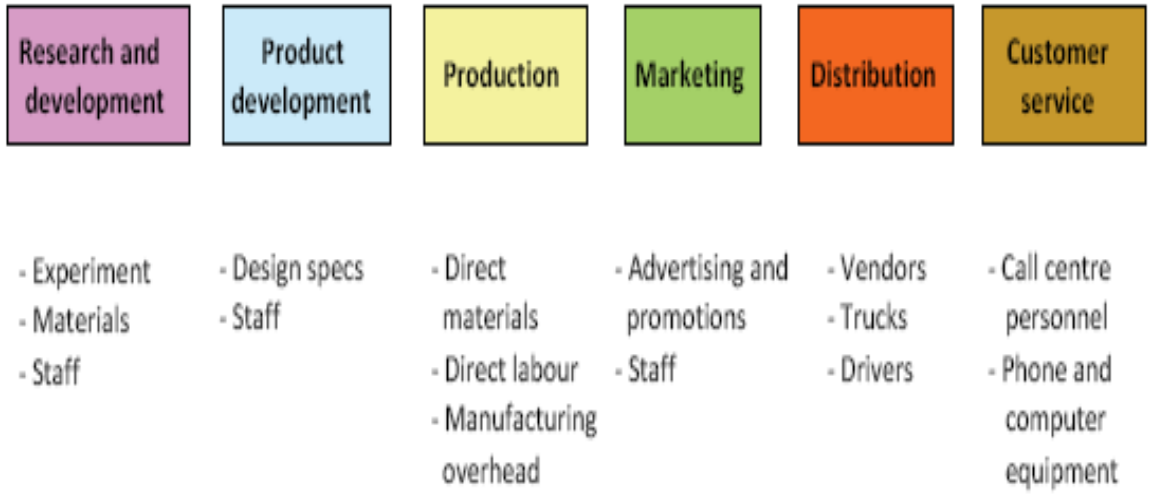
Weustink and Kals (2000) summarised a cost model that summarised all expenses a company incurs. These are shown in Table 2.2. The costs for different stages of the product development cycle can be assigned to different groups for analysis. Lately,

environmental aspects have influenced production; it has been recognised that the product development cycle and the product life cycle have to be extended to the disposal and/or recycling phase. Although usually the perception exists that environmental aspects have to be treated apart, the costs concerned with the disposal and recycling phase can be treated in the same way as any other phase that has been discerned.

Table 2.2: Life cycle stages and costs from Alting (Asiedu, 1998)

	Company cost	Users cost	Society cost
Design	- Market recognition - Development		
Production	- Materials - Energy - Facilities - Wages, salaries etc.		- Waste - Pollution - Health damages
Usage	- Transportation - Storage - Waste - Breakage - Warranty service	- Transportation - Storage - Energy - Materials - Maintenance	- Packaging - Waste - Pollution - Health damages
Disposal/recycling		- Disposal/recycling dues	- Waste - Disposal - Pollution - Health damages

Jackson and Sawyers (2003) also demonstrated the life cycle costs components as shown in Figure 2.7. This is almost similar to the costs scoping earlier on summarised above.



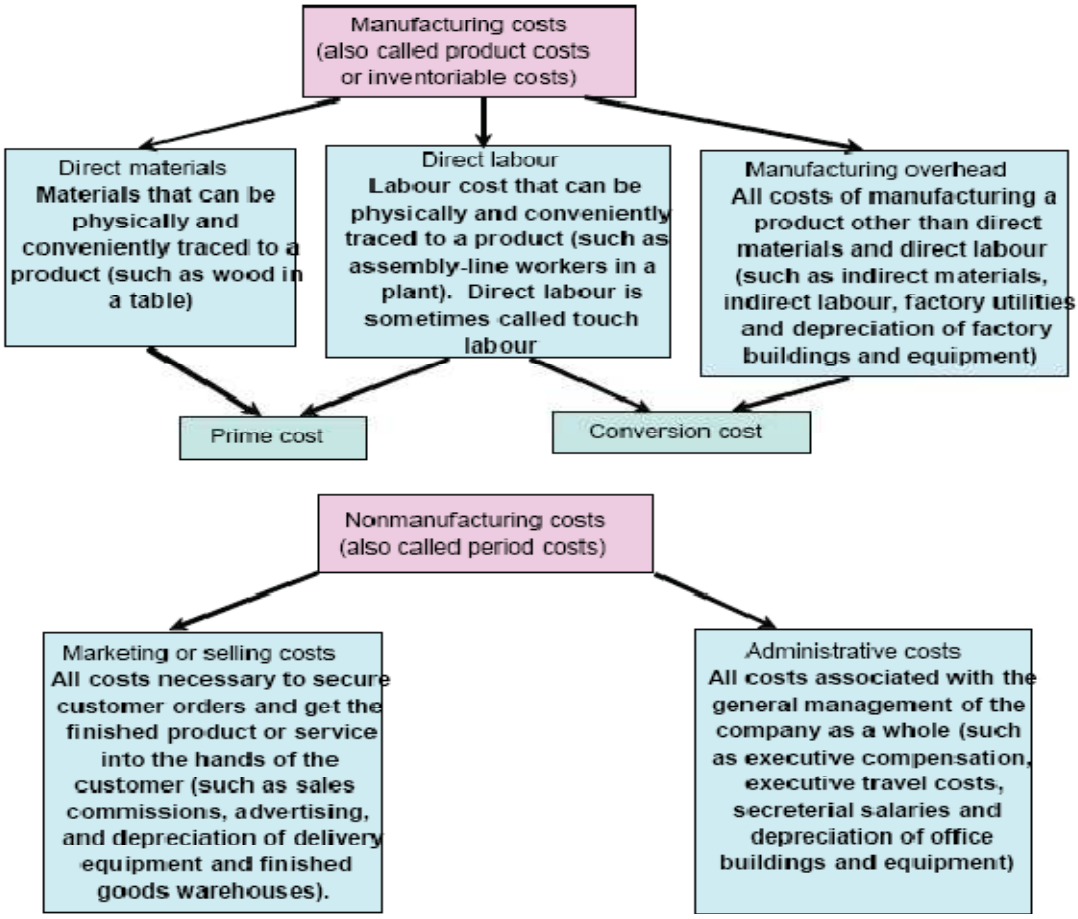
Source:

Adapted from Jackson & Sawyers (2003:37)

Figure 2.7: Life cycle costs components

2.6.1 Summary of cost terms

The cost terms components can be summarised in the figure below that shows the levels and the definitions. It basically shows the categorisation of manufacturing costs into direct labour, direct materials and manufacturing overheads. There are also non-manufacturing costs that should be taken into consideration. These include items such as marketing and administrative costs



Source:

Adapted from Garrison et al (2006:40)

Figure 2.8: Summary of cost terms

2.7 Value chain

2.7.1 Definition of Value Chain

The idea of a value chain was first suggested by Porter (1985) to depict how customer accumulates along a chain of activities that lead to an end product or service.

He described the value chain as the internal processes or activities a company perform "to design, produce, market, deliver and support its product." Porter (1985)

further stated that "a firm's value chain and the way it performs individual activities are a reflection of its history, strategy and approach of implementing its strategy.

Porter (2000) classified business activities under two heads as shown in Figure 2.8, Primary activities are line activities and support activities. Primary activities are directly involved in transforming inputs into outputs and delivery and after-sales support to output. These include;

- material handling and warehousing
- conversion of inputs into final product
- order processing and distribution
- communication, pricing and channel management, and
- Installation, repair and parts replacement.

According to Porter (2000), support activities are the activities, which support primary activities and include.

- Procurement-purchasing of raw materials, supplies and other consumable ill well as assets.
- Technology Development-know-how, procedures and technological inputs needed in every value chain activity.
- Human resource management-selection, promotion and placement, appraisal, rewards; management development; and labour/employee relations.

- Firm infrastructure-general management, planning, finance, accounting, legal, government affairs and quality management.

'

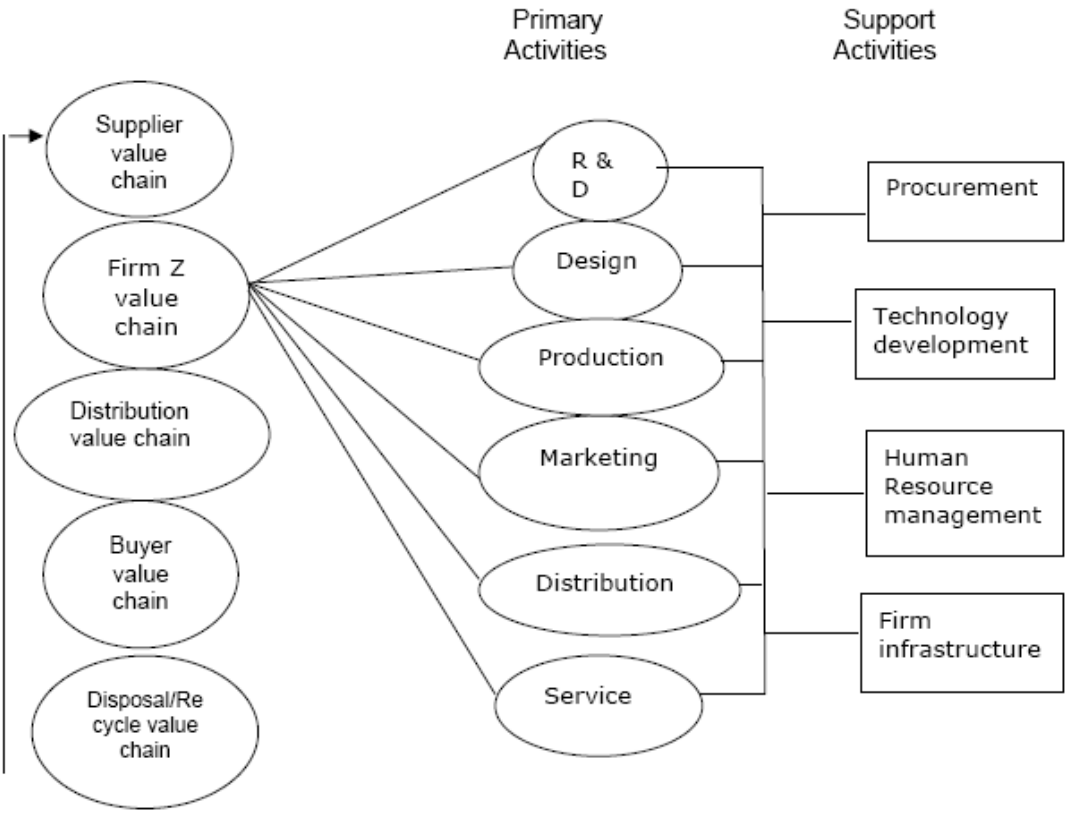


Figure 2.9: Value chain analysis (Shank, 2002)

Shank and Govindarajan (2002) defined that "the value chain for any firm is the value-creating activities all the way from basic raw material sources from component suppliers through to the ultimate end-use product delivered into the final consumers' hands." The description views the firm as part of an overall chain of value-creating processes.

Industry Value Chain: The industry value chain starts with the value-creating processes of suppliers, who provide the basic raw materials and components, continues

with the value creating processes of different classes of buyers or end-use consumers, and culminates in the disposal and recycling of materials.

2.7.2 Value chain approach to Cost Management

Hilton (2008) postulated that in order for a company to achieve a sustainable competitive advantage, it must either;

- Perform one or more activities in the value chain at the same quality level as its competitors, but at a lower cost, or
- Perform its value chain activities at a higher quality level than its competitors, but at no greater cost.

Understanding the value chain, and the factors that cause costs to be incurred in each activity in the value chain, is very important in the development of a firm's strategy. These factors are called cost drivers. The overall recognition of the importance of cost relationships among the activities in the value chain, and the process of managing those cost relationships to the firm's advantage, is called strategic cost management.

This concurs with Porter (1985) in his value chain theory when he indicated that there is a 'cost chain' corresponding with the valuable activities that exists on the value chain. Starting from the expense devotion for the product R & D, the preparation before the production, and various consumptions in the making process, until the establishment of sales channel, marketing and distribution output and expenses after service, this "cost chain" supports various activities on the value chain to be developed effectively to increase the values of the product and fulfil clients' demands. As the comprehensive consumption index of the value chain activity, the cost is represented by a sort of form of 'negative increment'. The value chain cost management is to manage "cost chain" on the value chain of the product, eliminate the activities without increments, reduce amount of "negative increment", minimise the cost on the whole chain, enhance efficiency of the whole supply chain and make the enterprises on the chain all win.

Porter realised that a company cannot reduce costs and/or create value for the customers by looking at the value chain activities as a whole but from separate activities in designing, production, marketing, delivering and supporting its products. Each of the activities can improve a company's cost position and customer value. For example, a superior product design a highly efficient assembly process, procurement of high quality inputs, responsive order entry system, low cost products distribution system, may enable a company to improve its cost position and customer value.

A study by Carr, Lawler and Shank (2002) revealed that companies strove to create substantial increases in wealth by challenging the ways they implemented their strategies. This is in tandem with what George (2012) claimed as highlighted in the previous paragraphs. One such process called value-chain-based analysis was achieved by performing these five steps:

2.7.3 Value System

As a follow up to the value chain explained above, it has been discovered by Porter (1998) that a company is an element of a value system. He pointed out that a company's value chain is embedded in a broader value system that provides inputs into the company and helps transfer outputs to ultimate consumer. Figure 2.10 illustrates the value system for an industry.

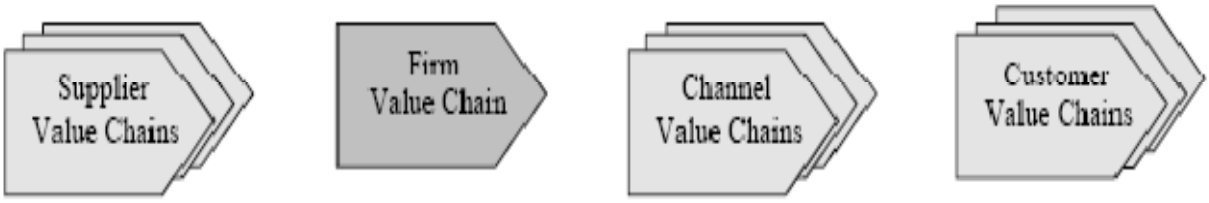


Figure 2.10: The value system according to Porter (1998)

Within the whole value system, there is only a creation value of profit margin available, that is, the difference of the final price the customer pays and the sum of

all costs incurred with the production and delivery of the product/service. It depends on the structure of the value system, how this margin spreads across suppliers, producers, distributors, customers and other elements of the value system. (Gadiesh and Gilbert 1998). Each member of the system will use its market position and negotiating power to get a higher proportion of this margin.

2.7.4 Value stream:

Three elements of the value chain must be mapped - the physical stream originating with the first entity that supplies any raw input to the system, and ending with a specified customer (regardless of legal boundaries); the information stream that enables the physical stream; and the problem-solving/decision making stream that develops the logic of the physical stream. Figure 2.11 shows costs that are included in the value stream costing (Baggalley, Maskell, 2002) and Figure 2.12 depicts a typical order fulfilment value stream

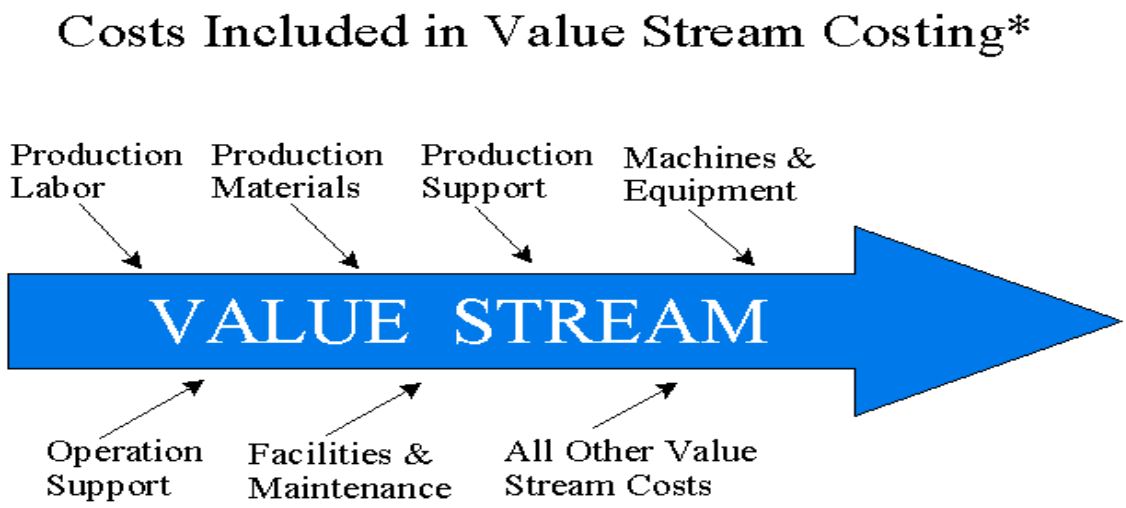


Figure 2.11: Costs included in Value stream costing

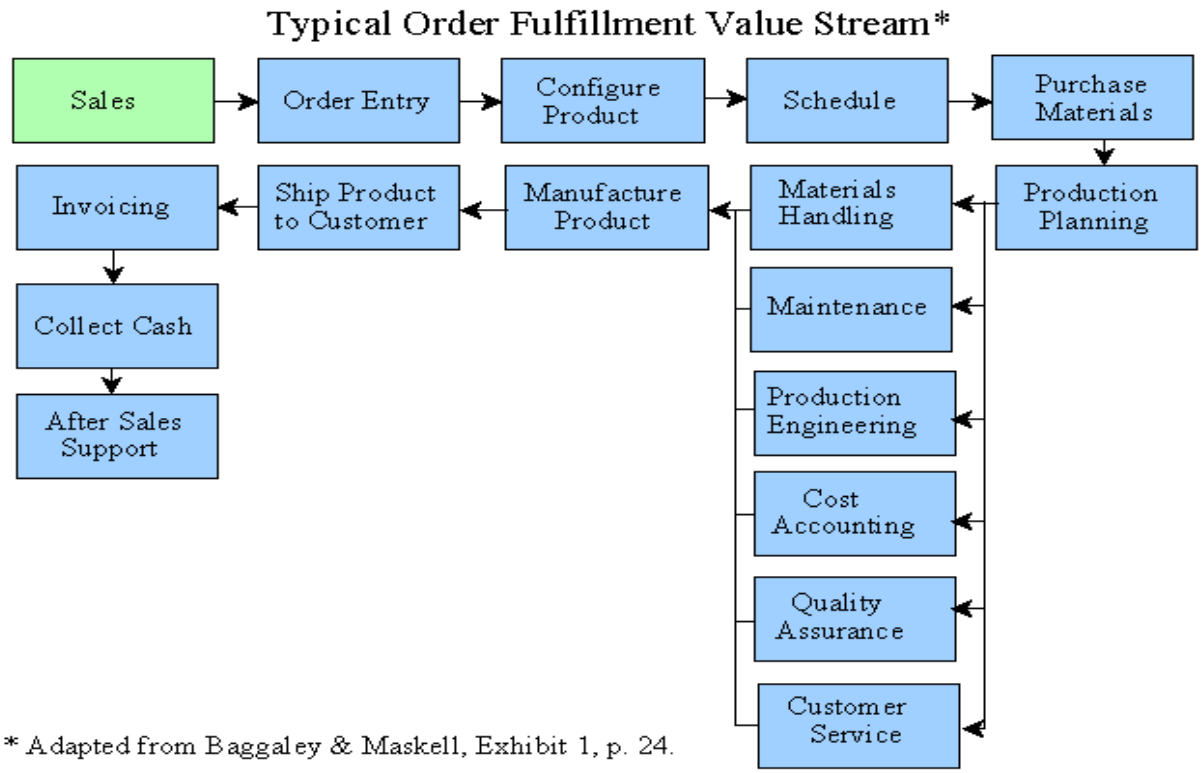


Figure 2.12: Typical order fulfilment value stream

2.7.5 Value Cycle Time:

The mentioned value stream analysis is in line with what the researcher mentioned in the earlier chapters whereby the same approach was used for the case, that is, to have a full spectrum of the costs from the procurement of raw materials right through to the distribution of the final product. Qaisar, Iqbal, Nadeen and Amir (2011) also supported the idea of value stream analysis when they highlighted that 'Cost efficiency and effectiveness is always achieved through value creation at different stages ranging from pre-production to post production. Various cost management techniques (CMT) are used for this purpose from R & D till after sales customer services as shown in figure below.

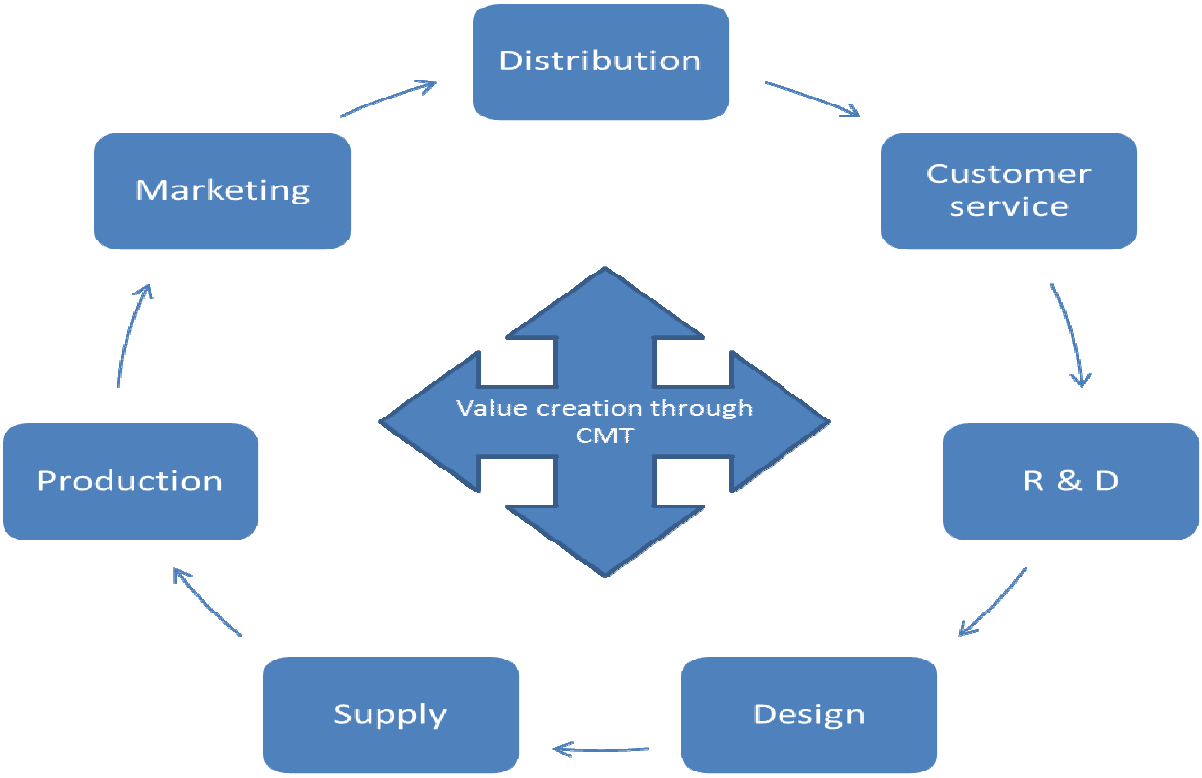


Figure 2.13: Value cycle time and CMT. Adopted from Nadeem (2011)

2.7.6 Internal Cost Analysis

According to Nadeem (2011), organisations use the value chain approach to identify sources of profitability and to understand the cost of their internal processes or activities. Internal cost analysis is guided by the following principal steps.

- Identify the firm's value-creating processes.
- Determine the portion of the total cost of the product or services attributable to each value-creating process.
- Identify the cost drivers for each process.
- Identify the links between processes.
- Evaluate the opportunities for achieving relative cost advantage

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2.8 Advanced manufacturing techniques and manufacturing cost management

According to Modarress (2000), the Manufacturing environment is undergoing revolutionary changes with the advent of advanced manufacturing techniques. Many companies are adopting new manufacturing technologies to remain competitive in the face of increasing global competition. These include Just-In-Time (JIT) and lean manufacturing to reduce or eliminate waste in the total manufacturing cycle for the purposes of reducing cost, improving quality, performance, delivery, flexibility and innovativeness. Waste is non-value adding activity and includes inventory, materials handling, queues and delays, quality problems and rejects.

2.9 Just-in-time (JIT)

JIT affects every aspect of the manufacturing process including the nature and volume of raw material, work in process and finished goods. Product quality and layout of production facilities are also influenced by JIT (Horngen, 2000). Realising the benefits of JIT depends on the firm's ability to manage costs, that is, being able to identify the driving force behind non-value added activities.

Crusoe and Scheelze (2009) however, argued that 'whilst JIT is a good philosophy, it also has got some hidden costs associated with it hence it always has to be approached with caution. These hidden costs include labour union leverage, problems with flexible manufacturing systems (FMS), developing a flexible workforce, difficulties with supplying commodities under JIT, increased expenses for suppliers and increased space needed for JIT machinery'.

FMS use computer-controlled production processes including computer aided design (CAD), computer-aided-manufacturing (CAM), programmable machine tools and robots (Kaplan and Atkinson, 1989).

2.10 Facilities Costs

Another main area of manufacturing process change is the gradual increase in the facilities costs relative to the costs of materials and labour in the product (Blocher,

1999). These include the cost of activities performed to sustain general production capability of the manufacturing plant. Facilities costs have increased relative to the costs of materials and labour used in production. Some companies that once viewed facilities costs as uncontrollable and focused their attention on managing labour and materials costs have now redirected their attention to controlling facilities costs. Generally, advanced manufacturing technologies have dramatically changed manufacturing cost behaviour patterns; for example, direct labour costs are decreasing, while depreciation, engineering and data process costs are increasing. These changes have resulted in higher overhead rates and a shrinking base of labour over which to allocate costs.

2.11 Business Process Reengineering (BPR)

Hammer and Champy (1993) defined BPR as the 'fundamental rethinking and radical design of business processes to achieve dramatic improvements in critical contemporary measures of performance such as cost, quality, service and speed'. The definition sets improving the efficiency and effectiveness as the main focus of attention.

This process largely focused on operational changes, that is, work flow, system enablers, departmental structure information flow. The more robust applications improved the performance measurements of the organisation. One time improvement efforts might not have significant impact unless used in conjunction with process management and continuous improvement. They form a complementary system when used in conjunction with process reengineering and become foundation for initiatives such as ABC and capacity measurement and management.

2.12 Performance measurement and balanced scorecard in cost management

A key component of the cost management evolution is a focus on the importance of performance measurement. It was developed by Robert Kaplan and David Norton,

and the methodology translates an organization's strategy into performance objectives, measures, targets, and initiatives in four balanced perspectives: Financial, Customer, Internal Process, and employee learning and growth. It is worth noting that while many organizations have used a combination of financial and non-financial measures, what sets the Balanced Scorecard apart is the concept of cause and effect linkages. A well-constructed Scorecard will tell the story of an organization's strategy through a series of linked performance measures.

Many "traditional" cost management professionals may view the Financial perspective of the Scorecard as their natural home, since many cost-related insights will be revealed in that section of the tool. However, upon further reflection we discover that modern Cost Management cuts a wide swath through the entire scorecard architecture. From the Customer perspective, organizations must determine their target customers and also devise the value proposition they will use in pursuing that group. However, these drivers cannot be taken for granted. As with any other investment, the Cost Manager must determine the true value being created from each dollar of cost (Robert, 2006).

A number of organizations reaping the rewards of the Balanced Scorecard cite an increase in "strategic conversations" as a key benefit of the effort. The organisations note that while Scorecard results do not always supply every answer in the firm's quest to execute its strategy they do lead to better questions, since executives, managers, and employees work together to critically examine and learn from the assumptions inherent in the scorecard. There will be a renewed focus on providing critical information in the drive to create customer value and a clear motivation for change. This focus is created by cost Management profession since he or she is in an enviable position of facilitating many of these strategic dialogs throughout the modern (Robert, 2006)

2.13 Cost Management versus Cost Accounting

According to Robert (2006), managing cost differs greatly from accounting for them and while many organisations believe that they are managing costs, such

organisations are depriving themselves of the benefits that the management processes deliver. Cost accounting addresses questions like how much and what for?. It lacks the analytical part and does not merely address history or tells what happened. On the other hand, cost management focuses upon measuring performance, comparing against expectations and finding reasons for divergence. Cost management also endeavours to predict final outcomes and to provide strategic recommendations for changing or mitigating such. It is forward looking and attempts to answer why, what it means and what can be done about it.

2.14 Chapter summary

The chapter has explored in detail on the concept of cost management, focusing on effective and strategic cost management. The major area covered also was the value chain theory in which the need to split costs throughout the value chain has been highlighted. It also looked into previous literature on some of the cost management measures that can be implemented. These include business process reengineering, performance measurement and balanced scorecard, target costing etc. A comparison of cost management and cost accounting has also been included.

CHAPTER THREE:

RESEARCH METHODOLOGY

3.0 Introduction

According to Nacchamius and Frankfort (1996), methodologies are considered to be systems of explicit rules upon which research is based and against which claims of knowledge are evaluated. This Chapter focuses on the methods, techniques and tools that are used in the collection, classification, management and analysis of data. It also covers the theory of research design, research methods used, target population, research instrument applied, data collection procedure, justification of approaches used and data analysis.

3.1 Research Design

According to the business dictionary, a research design is a detailed outline of how an investigation will be done. It normally includes how data is to be gathered and the instruments to be used for analysing the data collected. This concurs with Ader and Mellenbergh (2008) who postulated that research design encompassed methodology and procedure employed to conduct scientific research.

Fraenkel and Wallen (1996) defined a research design as a strategy for the study and the plan by which the strategy is to be carried out. They stated that the design will have specific methods and procedures that are used in collecting, measuring and analysing the data. It is used to structure the research and to show how all the major parts of the research project-the samples or groups, measures, treatments, or programmes and methods- work together to try to address the central research question(s).

3.2 Research philosophy

According to Bless and Higson (1995), there are two basic research philosophies which are qualitative and quantitative. Many studies use both qualitative and quantitative approaches whereby qualitative one will be used to understand and explore behaviour and attitude. On the other hand, quantitative approach will be used to conclude or confirm how widespread these behaviours and attitude are, (Wilson, 2006).

Qualitative rather than quantitative approaches allow researchers to work closely with participants within an organisation and collect information pertaining to their personal thoughts and experiences (Bonoma, 1985). On the other hand, Berg, (2001) argues that quantitative research has the ability to verify quantitative data since many people feel safe only with statistics, which can be verified and quantified to support findings. To cater for the different perspectives about qualitative and quantitative research, in this study triangulation was employed by the researcher. Plooy (1995) point out that triangulation is an attempt to include multiple sources of data collection in a single research project so as to increase the reliability of the results, and to compensate for the limitations of either qualitative or quantitative approach. This research combined the research approaches in order to take advantage of the strengths of the two approaches, to obviate the weaknesses of a single approach and to increase reliability and validity of findings.

The differences between quantitative and qualitative approaches are summarised in Table 3.1

Table 3.1: Differences between quantitative and qualitative research strategies

Item	**Quantitative**	**Qualitative**
Ontological orientation	Objectivism	Constructionism
Epistemological orientation	Positivism	Interpretivism
Orientation to the role of theory in relation to research	Deductive	Inductive
Question format	Close ended	Open ended
Flexibility in study design	Stable till the end of the study	Some aspects are flexible
General framework	Seek to confirm hypothesis about phenomena	Seeks to explore phenomena

Source: Bryman and Bell (2003)

3.2.1 Positivism

The researcher uses positivism philosophy because of the need to provide certain quantitative data that will help provide evidence. Data is more objective and scientifically derived using fundamental scientific laws. It is difficult to alter figures and hence use of figures eliminates subjectivity when searching for irregularities and casual relationships between elements. In Chapter 4, the researcher subjected data to graphical presentation.

3.2.2 Interpretivism

According to Cohen and Manion (1994), interpretivist or constructivist approaches to research have the intention of understanding "the world of human experience", suggesting that "reality is socially constructed" (Mertens, 2005). Creswell (2003) further highlighted that the interpretivist or constructivist researcher tends to rely upon the "participants' views of the situation being studied" and recognises the impact on the research of their own background and experiences. The researcher uses the interpretivism paradigm by interpreting the responses from primary respondents.

3.3 Research strategy

According to Hussey and Hussey (1997), a research strategy can be in various forms ranging from experiments, archives, history, case studies, grounded theory, surveys, ethnography, action research and archival research. For the research in question, case studies and surveys have been found to be useful.

3.3.1 Choosing a research strategy

Table 3.2: Choosing a research strategy

Strategy	Form of research question
Experiment	How, Why
Survey	Who, What, Where, How many, How much
Archival analysis	Who, What, Where, How many, How much
History	How, Why
Case Study	How, Why

Choosing a research strategy can be guided by the form of research questions as shown in Table 3.2

3.3.2 Surveys

Survey research is one of the most important areas of measurement in researches. The broad area of survey research encompasses any measurement procedures that involve asking questions of respondents (Hussey, 1997). This is a descriptive research method used when a researcher wants to collect data on phenomena that cannot be directly observed. According to Hussey and Hussey (1997), a survey is used where a sample of subjects is drawn from a population and studied so that inferences can be made about the population. Survey approach was used because of the ability if offers in terms of data collection. It can be used to describe populations that are too large to observe directly and has much flexibility and versatility. The researcher used the survey method, utilising the neutrality of the questionnaire followed by interviews to a selected senior management staff.

3.4 Case study

A case study is an in-depth study of a particular situation. It is a method used to narrow down a broad field of research into one easily reachable topic. It is used to excel in exploring a complex subject and strengthen an already existing previous research. According to Yin (1984), case studies are there to give an emphasis on the analysis of limited number of events and their relationships. He defined case study research as research method used in empirical enquiry for exploring on contemporary phenomenon.

The researcher is a Delta Beverages employee hence it became easier to carry out the case study approach. The researcher realised the need and an opportunity to find cost effective means of running the business.

The research will focus on a single case study focusing on Delta beverages. The reason for using a case study is because the chosen case is representative of the Manufacturing sector. More so, there is sustainable access of information to acquire in-depth data. The advantage of a single case study is that there is greater focus during data collection and analysis on the area of study than in multiple case studies.

3.4.1 Justification for using a case study

It has been discovered that a case study provides more realistic responses than a purely statistical survey. The advantage of the case study research design is that it enables one to focus on specific and interesting case in an attempt to test a theory with a typical case. During the process of trying to prove or disapprove a hypothesis, case study might introduce new and unexpected results leading the research into a new direction. Furthermore, when presenting results, case studies make more interesting topics than purely statistical surveys.

3.5 Time Horizons

The research is cross sectional and covers an analysis of events that occurred at Delta Beverages Southerton plant within the period 2010 to 2012

3.6 Population

Jacobsen (2005) defines population as the whole group the research focuses on. In the case in study, Delta Beverages Lagers plant Harare has a total of 649 permanent employees which constitute the population. Conducting research to such a large number would be cumbersome, costly and time consuming. The researcher saw it thus prudent to implement sampling techniques in dealing with the cross functional groups. The groups under study include, Procurement, Engineering, Brewing, Packaging, Warehousing and Distribution, Information technology,

Finance, Human resources, Sales and Marketing. Survey method was used by the researcher as the research strategy in implementing sampling techniques.

3.7 Sampling techniques

A sample is referred to as the segment of the population used for investigation and inference purposes (Bryman and Bell, 2002). In the case study, stratified random sampling method was used. The researcher categorised the population into ten different strata with the functional departments serving as the strata. Random samples, both management and staff were then drawn from each strata for carrying out the survey. The sampling frame for the organisation is shown in Table 3.3.

Table 3.3: Sampling size for questionnaire distribution

Section	Senior Managers	Employees	Labour compliment	Sample Size
Sales & Marketing	8	125	133	10
Warehouse & Distribution	4	99	103	10
Finance	5	19	24	5
Human Resources	2	21	23	5
GM's office	2	14	16	3
IT	3	5	8	4
Plant Admin	1	3	4	1
Brewing	3	65	68	12
Packaging	5	173	178	12
Engineering	5	44	49	13
Site Services	1	6	7	1
Quality Assurance	1	18	19	2
Procurement	1	16	17	2
Total	**41**	**608**	**649**	**80**

3.8 Data Collection

3.8.1 Secondary Data.

According to Zikmund (2003), Secondary Data refers to data that would have been collected and assembled for some other project. It is pre-recorded by someone prior to the current project. Compared to primary data, secondary data becomes a cheaper source of data. In the research case, such data has been gathered from company journals, monthly and quarterly reports, financial statements for the company, and strategic documents.

3.8.2 Primary Data

Primary data collection relies heavily on the following key primary sources, interviews, questionnaires and observation (Hussey and Hussey, 1997). The research implemented all the three techniques in the collection of data, with interviews mainly being done at management level.

3.8.3 Questionnaire

Trochim (1999) postulated that the design of a questionnaire should be done in the form of the pointers below.

- Make items clear;
- Avoid double barrelled questions;
- Ask in a way that makes the respondent competently answer the questions;
- Ask relevant questions;
- Ask short questions;
- Avoid negative questions; and
- Questions should not be leading.

Interviews will then be used to ensure that accurate data is collected from the respondents.

The development of the questionnaire, as in Appendix 2 depended on the use of the Likert Scaling Structure, structured as follows; Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree. These structures offered reasonably high validity and reliability.

The researcher used a structured questionnaire as an instrument for obtaining primary data for the study. The target group consists of 80 permanent employees selected from a population of 649. The questionnaire also enables respondents to maintain anonymity thus reducing bias. The questionnaires were hand delivered to the targeted recipients. These were accompanied by introductory letter to respondents emphasising on the importance of carrying out research in the area under investigation. The letter also gave assurance to respondents on aspects of confidentiality so that they could freely give information without being biased.

Pretest of the questionnaire

Pretesting of the questionnaire was done to ten employees so as to deduce improvements on the questionnaires. Improvements were then made on the questionnaire and editing was done before administering.

3.8.4 Interviews

Semi structured interview techniques were done as a follow up to come of the questionnaires that were distributed to the Delta Beverages employees. This was done in order to gather in depth information in some of the concepts and questionnaire questions and was directed mainly to managers. The purpose was to create greater amount of flexibility and maintain objectivity.

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3.9 Research ethics and Credibility

The researcher adhered to best ethical approaches in carrying out the research. Permission to carry out the research was sought from senior management first before proceeding and consent was granted. Assurance was cemented by the introductory letter that was given to the respondents so as to preserve confidentiality and completion of the questionnaires would then be done without bias.

3.10 Reliability/validity

According to Kimberlin and Winterstein (2008), the process of developing and validating an instrument is by and large focused on reducing error in the measurement process).

Reliability refers to the extent of consistency of measures. Three factors that are used to measure reliability are stability, internal reliability and internal observer reliability. According to Bryman and Bell (2003), validity refers to the extent to which a measurement instrument actually measures a concept it is intended to measure. Validity can be established using face, concurrent, construct, convergent and predictive validities, (ibid).

Reliability and validity will be ensured through using comprehensive questionnaires that use mostly open-ended questions.

3.11 Data Analysis

Regression and correlation analysis will be used to analyse the data. In view of the many variables to be considered, multiple regressions will be employed using appropriate tools like excel packages or SPSS

3.12 Limitations of the research

Some of the limitations encountered in the questionnaire were that some questions were specifically aligned to a particular department, to the extent that other sections will be neutral. An example of this is a question that is centred on the procurement being given to the sales and marketing employee. The responses expected under such circumstances will be mainly neutral. This was however countered through the use of interviews whereby specific questions were designed for sections so as to extract data pertaining to that particular section

3.13 Conclusion

The chapter covered the research design, research philosophy, approaches and strategies used by the researcher in addressing the research problems outlined in chapter one. The chapter also covered data collection methods, data collation and analysis tools used and how the researcher addressed issues of research ethics and credibility.

CHAPTER FOUR:

RESULTS AND DISCUSSION

4.0 Introduction

This Chapter focuses on the presentation of data that was collected in the study of effective cost management for Delta Beverages. The analysis is classified in both qualitative and quantitative approach to the findings. The data and opinions have been qualitatively derived from the questionnaire whilst quantitative data was obtained from secondary data and interviews conducted, mainly at supervisory and management level. Interviews were done as a follow up to the questionnaire ant the interview guide used is as attached in Appendix 3. The findings will also be discussed with reference to the literature review that was amassed in chapter two. The hypothesis that was proposed in chapter one will also be tested in a qualitative approach. The discussion of results commence with an overview of the demographics data, then proceeding to the findings from the main five themes in the objectives section.

4.1 Response rate

As indicated in Chapter three, a sample size of 80 employees has been selected from 649 employees hence a total of 80 questionnaires was administered. Out of these, 53 questionnaires were received back, representing a 66% response rate. Table 4.1 shows the distribution of response rate across the departments.

Table 4.1: Tabular presentation of responses to Questionnaire

Section	Senior Managers	Employees	Labour compliment	Sample Size	Response	Response rate (%)
Sales & Marketing	8	125	133	10	7	70
Warehouse & Distribution	4	99	103	10	5	50
Finance	5	19	24	5	4	80
Human Resources	2	21	23	5	2	40
GM's office	2	14	16	3	2	67
IT	3	5	8	4	2	50
Plant Admin	1	3	4	1	1	100
Brewing	3	65	68	12	7	58
Packaging	5	173	178	12	9	75
Engineering	5	44	49	13	9	69
Site Services	1	6	7	1	1	100
Quality Assurance	1	18	19	2	2	100
Procurement	1	16	17	2	2	100
Total	**41**	**608**	**649**	**80**	**53**	**66**

According to Saunders (2001), a response rate of 50% and above warrants validity of findings hence the overall response rate of 66 % obtained is high enough to ensure that the study results are valid and reliable.

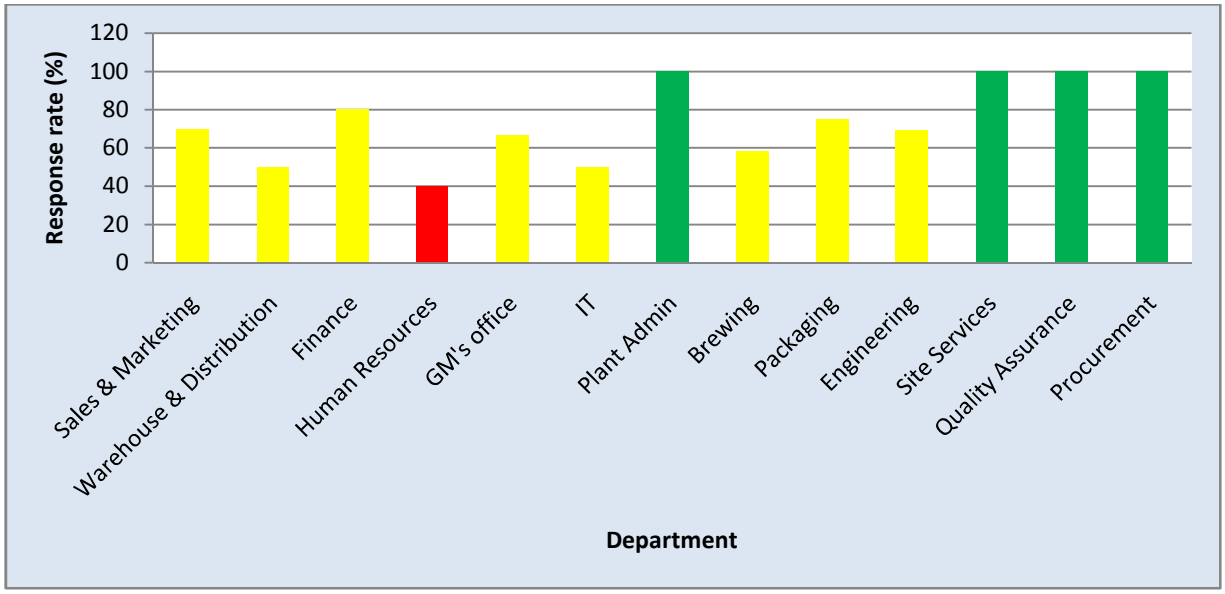

Figure 4.1: Questionnaire response rate by Section

In order to make a presentation of the response rate per department, Figure 4.1 has been used to indicate the spread. The general trend across the sections is satisfactory, save for Human resources that recorded a 40% rate. This has insignificant impact to the validity of the results since follow up interviews were also conducted in all the sections. Four departments, that is, Plant administration, Site services, Quality assurance and Procurement recorded a 100% response rate to the questionnaire. It is also important to note that the sample sizes in these departments were low (maximum of 2). The remaining departments had a response rate ranging between 50-80%. These sections also had fairly large sample sizes selected, proportionate to the number of employees in the department.

Managers and Supervisors for each section were randomly selected for interviewing as a follow up to the questionnaires. This was also done in order to have an in depth anatomy of the issue under study.

4.2 General Information

In this section, responses from questionnaires that covered demographic data are analysed. The responses obtained from interviews will be used in the sections to follow so as to buttress the findings obtained from the questionnaires. The data will be qualitatively and quantitatively presented in the form of tables and graphical trends.

4.2.1 Composition of Respondents

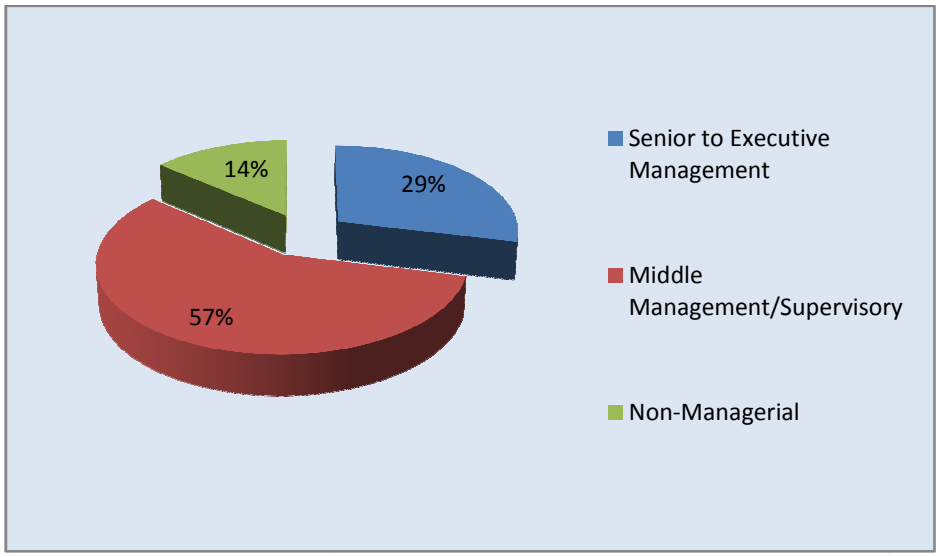

Figure 4.2: Composition of Respondents

Figure 4.2 represents the total number of respondents who completed the questionnaires that were subsequently analysed. There was a deliberate stratification of the data according to company positions. Most of the data related to cost management is obtained from the level of Supervisory or middle management to the executive level since these are the employees who can reliably show an understanding of cost management. Their responses are presumably expected to be credible, reliable and well informed. As such, 86% of the respondents come from the supervisory and managerial staff while 14% is the non-managerial staff. The greater part of the discussion will therefore be biased towards the discussion of responses obtained from 86% of the sample size that represents the supervisory staff upwards.

Of the 86%, Senior Managers to Executive level contributed 29% and this is an adequate representation especially factoring their composition in terms of absolute numbers, notwithstanding the fact that this was the major target group in terms of follow up interviews.

4.2.2 Respondents' length of service

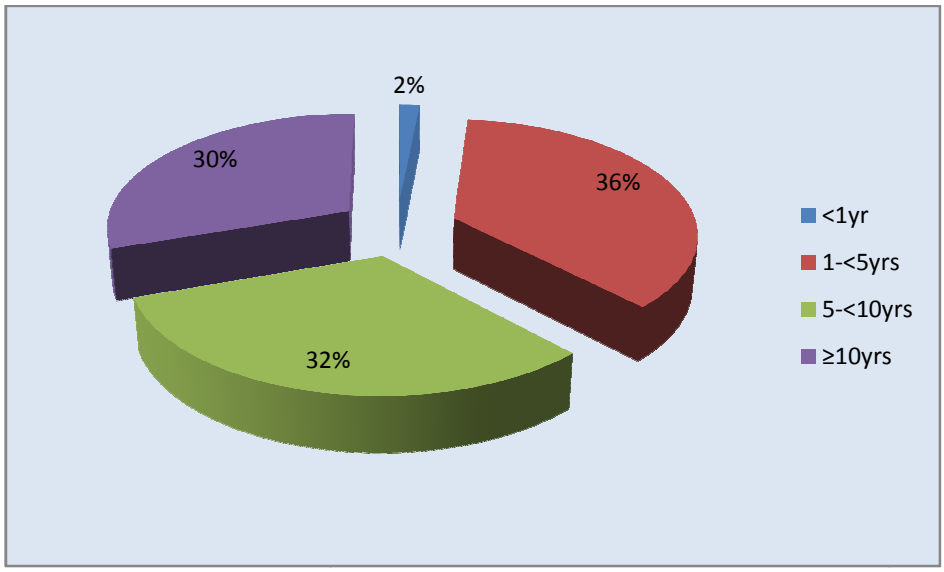

Figure 4.3: Respondents length of service

According to the respondents' demographics, 62% of the respondents have been employed by Delta Beverages Southerton plant for a period 5years and above. Only 2% of the respondents have been with the organisation for less than 1year. The remainder, 36% have been with the organisation for a period of 1-5years. Since majority of the respondents have been employed for more than 5 years, it means that there is a high level of credibility to the findings. The employees obviously exudes some deeper level of knowledge of the operations and more so an understanding of the major cost drivers and how these can be curbed. It is also important to note that an employee who would have worked for an organisation for a period of more than a year can confidently give credible results in terms of questionnaire responses. Given this background, 98% of the employees fall in that range hence a true reflection of what is happening on the ground. The service period for the respondents is shown in Figure 4.3.

4.2.3 Departmental Contribution to responses

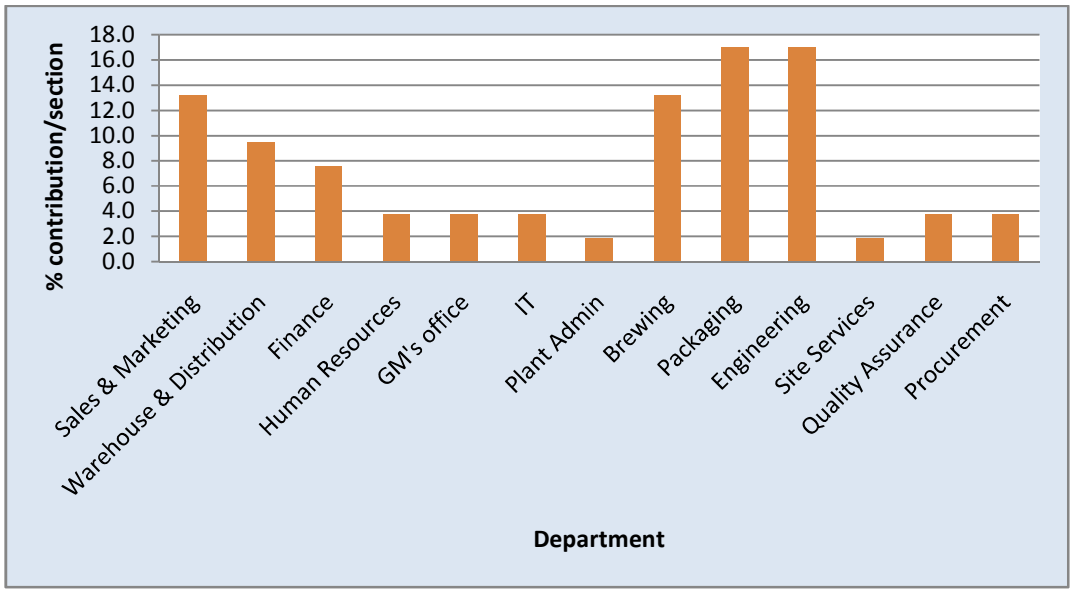

Figure 4.4: Departmental contribution to responses

In terms of percentage contribution to the respondents, the departments that have the highest contribution are Engineering, Packaging, Brewing, Sales and Marketing. This does not come as a surprise since these are the areas that contribute much to the plant's activities in terms of overheads also. Henceforth, it comes as no coincidence that more questionnaires were distributed to those Sections. It is also important at this point in time to understand the difference between this graph and Figure 4.1 that shows the response rate within the particular section.

4.2.4 Level of Education

Figure 4.5 shows that 29% of the respondents have attained Diploma, 44% Degree and 14% a Master's programme. This shows that majority of the respondents were educated enough to understand the needs of the research. The responses obtained are of paramount importance since it becomes apparent that they do understand the questions and their contributions play a key role.

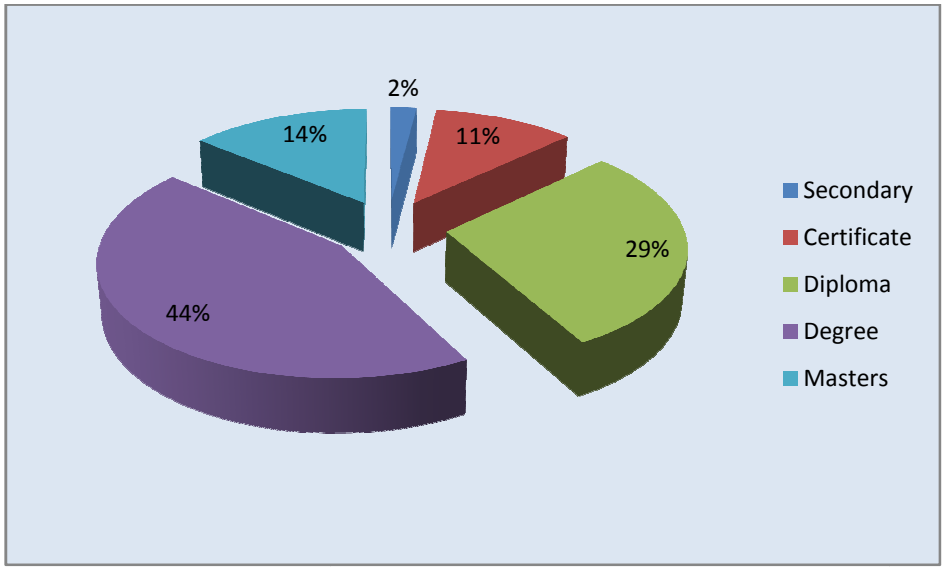

Figure 4.5: Level of Education

4.3 Impact and relevance of MANWAY on Effective cost Management

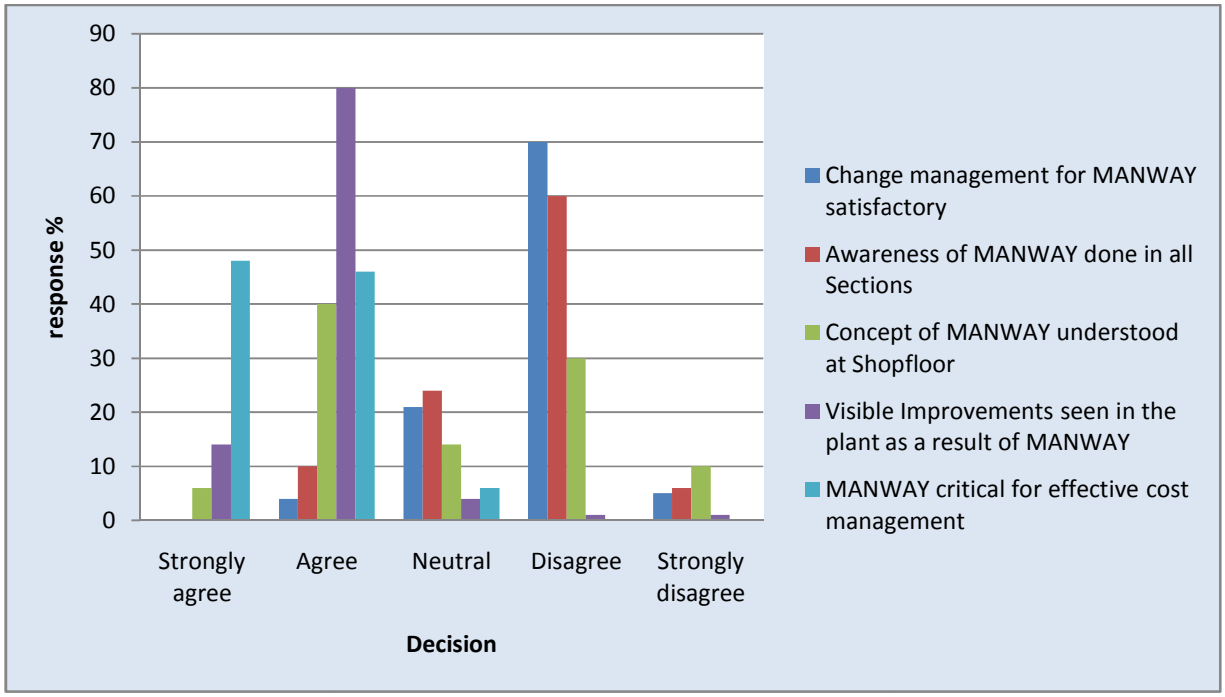

Figure 4.6: MANWAY relevance to Organisation performance and cost management

In this section, an analysis will be done to ascertain the extent to which the launched program, the Manufacturing Way (MANWAY) will generally impact on cost management activities. Aspects of whether or not a proper change management procedure has been implemented will also be looked into. MANWAY is a new concept of manufacturing operations, introduced in 2011 that is intended to usher the organisation processes into world class manufacturing (WCM). Some of the key focus areas that are covered under this concept are foundational pillars such as leading and managing change, teamwork, 5S, focused improvement, performance measurement and control, Asset Management, Autonomous Maintenance, Quality Management, Manufacturing Flexibility, Health and Safety Management and Environmental Management. Results from the questionnaire in terms of employees' opinions are presented in Figure 4.6. The foregoing discussion will be based on the respondents' results and also the information obtained from follow up interviews

4.3.1 Leading and Managing change

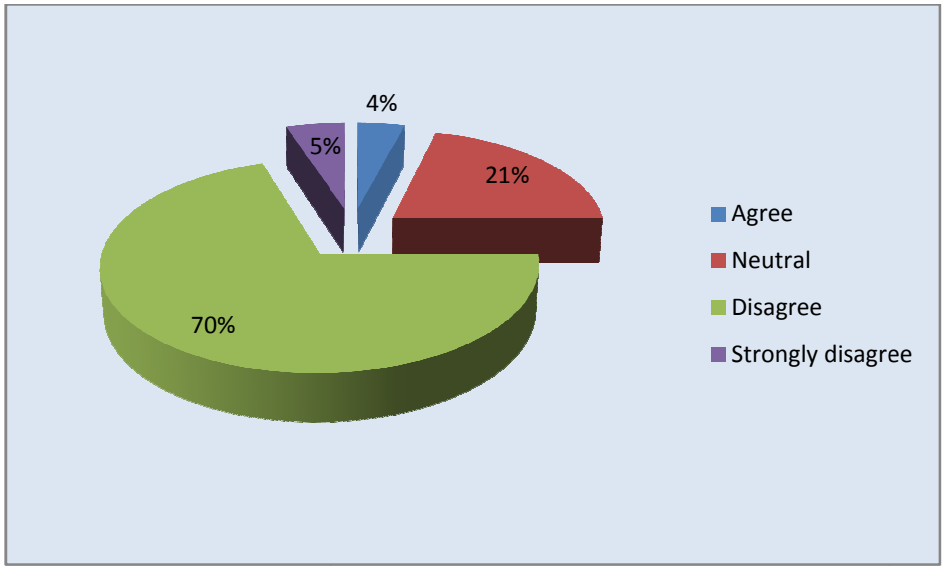

Figure 4.7: MANWAY change process satisfactory?

Whilst 80% of the respondents have agreed that there have been tremendous improvements in the processes since the launch of MANWAY (figure 4.6), 75% of

the respondents are of the opinion that the change process has been unsatisfactory as shown in figure 4.7. These respondents view that the foundation of change has not been set properly. For so long, the organisation has been aligned to certain ways of doing business hence the respondents feel that more effort and time should have been dedicated to explaining the new direction and the end state of change.

From Figure 4.6 above, only 46% of the respondents are convinced that MANWAY has well been understood at shop floor. This means that if the change process had been effectively implemented, this figure was bound to increase since most of the employees will grasp the basics of the new way of manufacturing. There is a positive correlation between understanding the concept and the improvements accrued in the plant. The more the shop floor team understands the concept, the greater the improvement in the plant operations since this is the team that does all the hands on, with the guidance and direction from management, though. Of the 70% who perceive that MANWAY change process has not been satisfactorily done, 85% believe that if implemented the concept results in effective cost management hence mileage can be gained if changes are done right first time. From Figure 4.7, only 4% agree that MANWAY change process has been satisfactorily done whilst 21% remained neutral.

4.3.2 MANWAY awareness level for the Organisation

An assessment of the knowledge of manufacturing way has been done to check awareness levels across all the sections. The responses show that 66% do not agree that it has reached all departments, 10% agree whilst 24% remained neutral. Upon following up, the 66% who disagree argue that there are certain sections of the organisation that are lagging behind in the understanding of MANWAY.

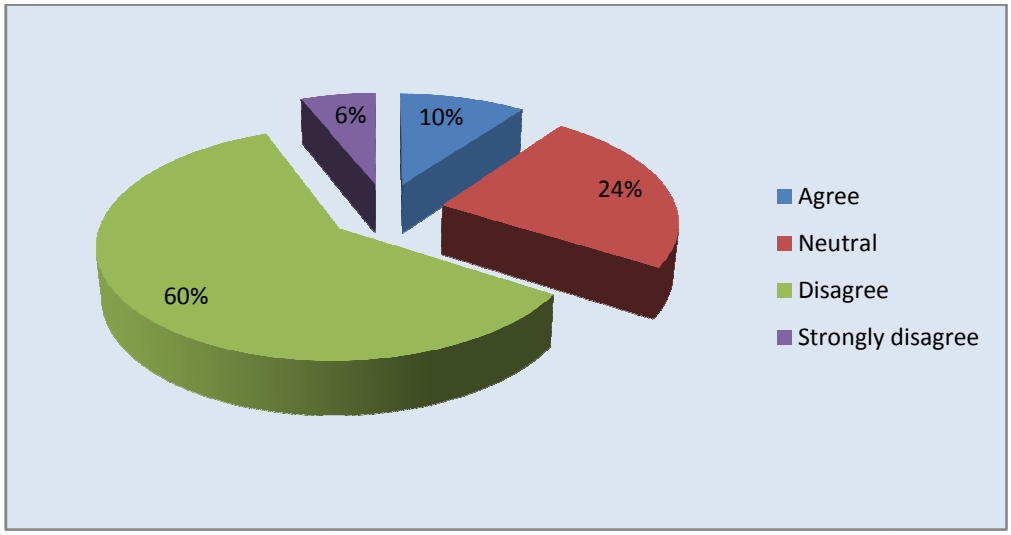

Figure 4.8: Awareness level for MANWAY reached all Departments?

The general sentiment is that departments like Finance, IT, Warehouse and Distribution, Human Resources, Sales and Marketing perceive MANWAY as only applicable to the Plant operations, that is, Engineering, Brewing and Packaging. This should not be the case since all operations are interdependent. Issues like budgets, organisational design, lead times on Spares procurement, among other areas need the full support of Finance, Human Resources and Procurement respectively, regardless of the fact that most of the guiding pillars are aligned to the Plant operations such as Autonomous Maintenance, Manufacturing Flexibility, Quality assurance etc. There are however pillars that are applicable to all operations such as Teamwork, 5S, Asset Management, Performance Measurement and Control, Health and Safety Management and Environmental Management.

4.3.3 MANWAY as an effective cost management tool

There was an overwhelming belief that implementation of MANWAY results in effective cost management, with 94% of the respondents buying into that. Only 6% of the respondents remained neutral.

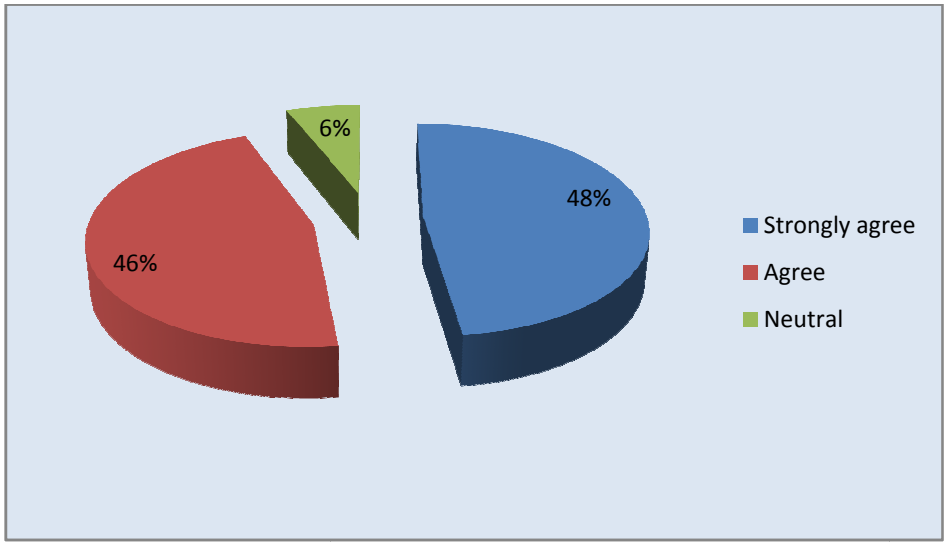

Figure 4.9: MANWAY results in effective cost management?

The results therefore reflects that there is a general consensus at all levels that there are benefits in store if the concept is implemented, augmented by the fact that not even a single employee disagreed. This is because of the expected optimisation in the business processes that will be realised through implementation of the various pillars mentioned earlier on. This will be discussed in more detail in the chapters to come when an analysis of interview results will be done. Considering the fact that 80% of the respondents have agreed that visible improvements in the Plant are already noticed, it therefore shows that, coupled to effective cost management, MANWAY becomes a powerful tool of carrying out operations.

4.4 Sustainable development drive versus Utilities costs

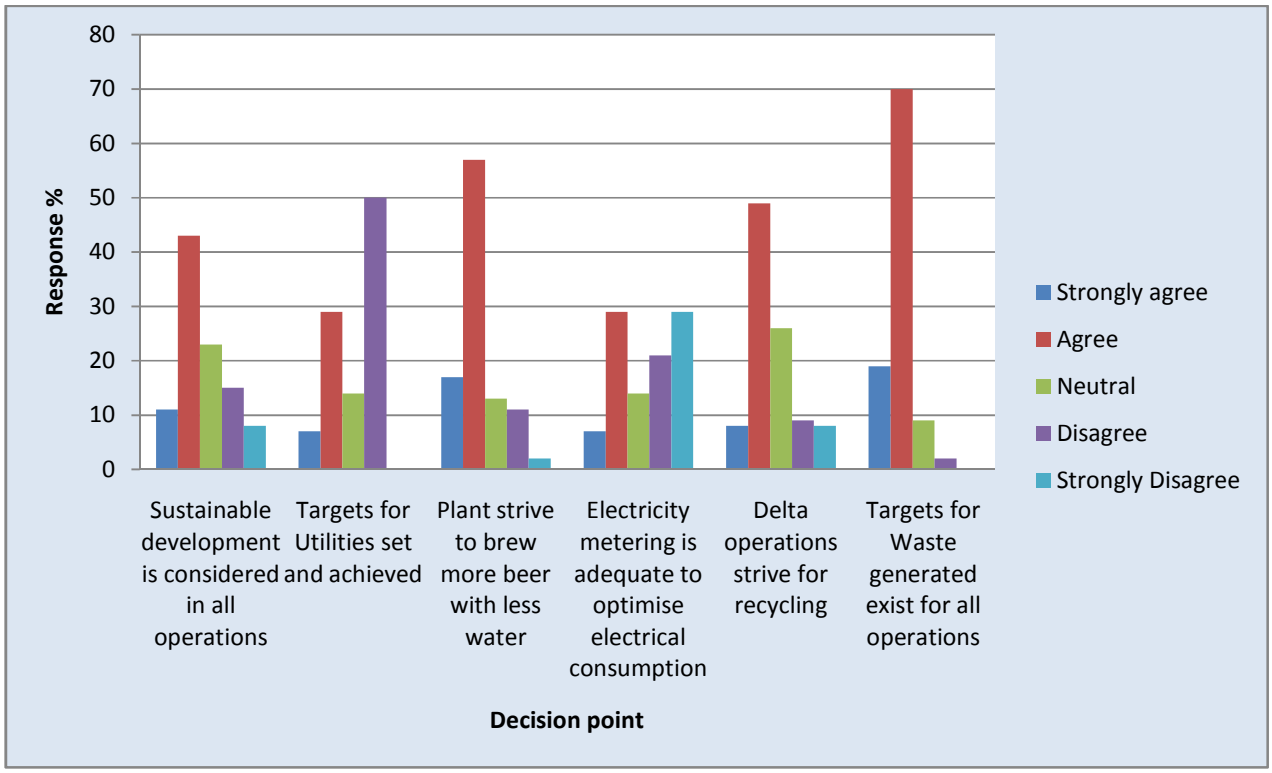

Figure 4.9: Sustainable development on Utilities costs

The questionnaire design was also intended to extract information on the contribution of Utilities costs to Delta beverages costs. Data on sustainable development was also gathered with main focus on the electricity and water consumption. The idea was to understand whether the operations understood and gave the necessary emphasis on the importance of sustainable development. A summary of the respondents' outcome is shown in Figure 4.9 above. The pattern of results however there is an awareness of sustainable development at the plant. The main talking point derived from follow up interviews was whether or not targets are being met or not.

4.4.1 Sustainable development-key concept in all operations

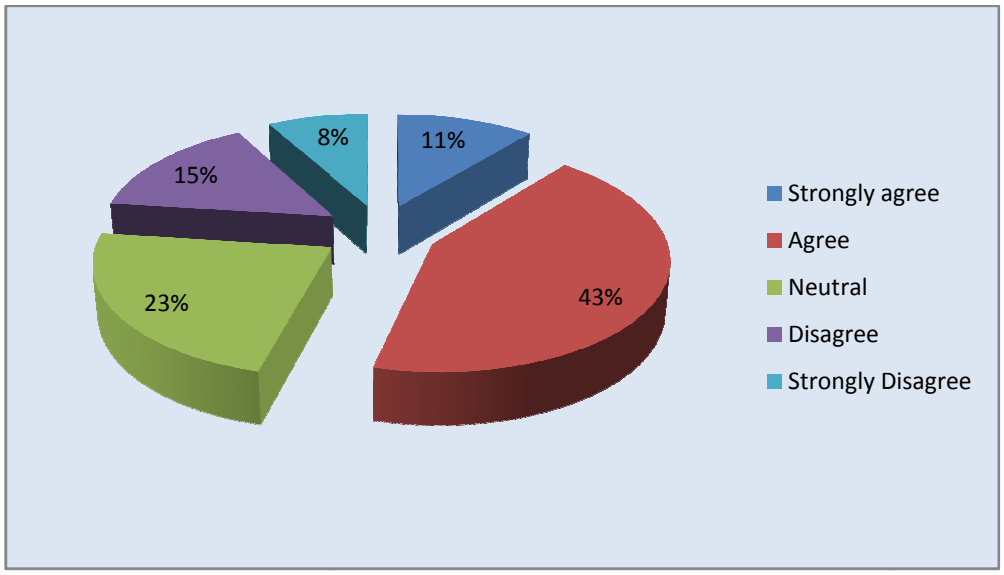

Figure 4.10: Sustainable development is key in all operations?

According to the study, 43% of the respondents agree that sustainable is key component considered in all operations, while 11% strongly agree to this concept. Not surprisingly then that there is high percentage on agreement to other five decision criteria since there is a positive correlation. They all talk to sustainable development, that is, water management, electricity management, recycling drive and waste management. There is an 8% portion that strongly disagreed and their argument was that there is not adequate awareness at the organisation in terms of basic water and electricity management. Small activities such as closing of water taps, switching of lights during the day are not being adhered to. They argue that it is these minor actions that contribute a lot instead of simply focusing on water and electricity consumption for the production operations only.

4.4.2 Utilities targets

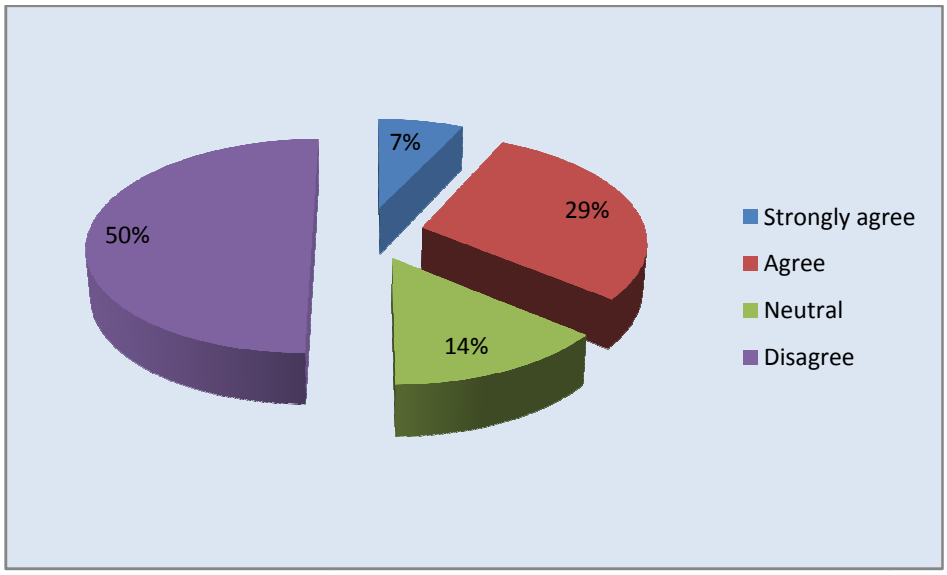

Figure 4.11: Targets for Utilities set and achieved

In this category, 29% of the respondents believe that targets for utilities are set and being achieved, while 7% strongly agree to the same issue. The percentage of 14% remained neutral on this aspect. Of the 50% that disagreed to the sentiments, 45% explained that the targets are set but are not being achieved whilst 5% still believes that there are no targets to talk about that have been set. By merging the sentiments above, it shows that 79% agrees that targets for Utilities consumption have been set.

4.4.3 Electricity Metering for Electricity consumption optimisation

The respondents did not agree that there is adequate electricity metering to optimise electricity usage within the plant. Figure 4.12 shows that 64% did not agree that it is adequate. This shows a deficiency in the operations and this is also supported by the deviation from targets that will be explained in the proceeding chapters. Only 7% agree that electricity metering is adequate whilst 14% remained neutral.

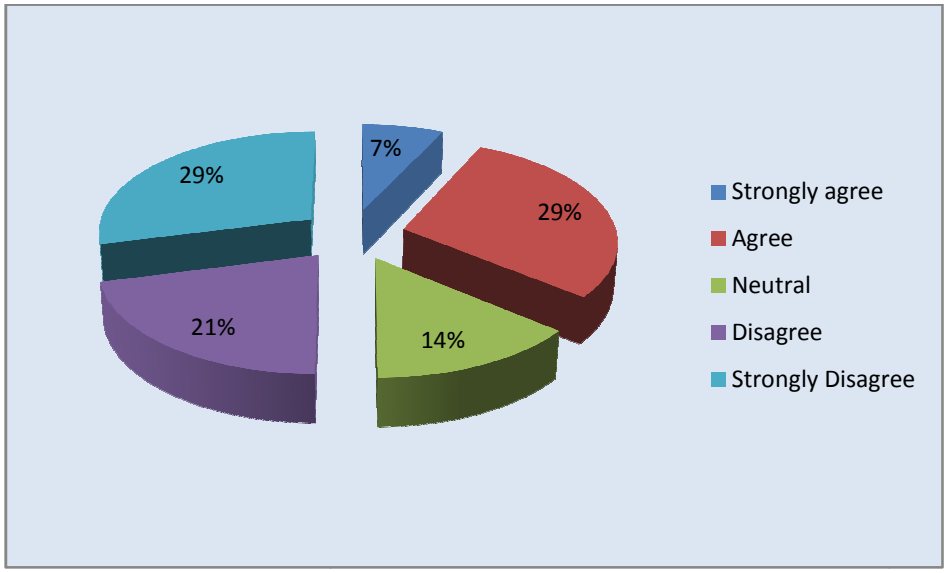

Figure 4.12: Is electricity metering adequate?

Energy management is a very crucial step to undertake especially for an industrial site that pays more than a million dollars per year towards electricity consumption. There is therefore need for optimising consumption to be within the set targets so as to eliminate leakages.

4.5 Variable Costs

Delta Plant Southerton operates at more than 90% capacity in order to meet consumer demand for beer and canned drinks. Variable costs are costs that are directly related to the level of production hence the busier the operations the more the variable costs incurred. If not managed effectively then, these costs become a burden to the organisation. As part of the questionnaire design, a section was designed in order to drill down into the current situation and perception as far as controlling and managing these costs is concerned.

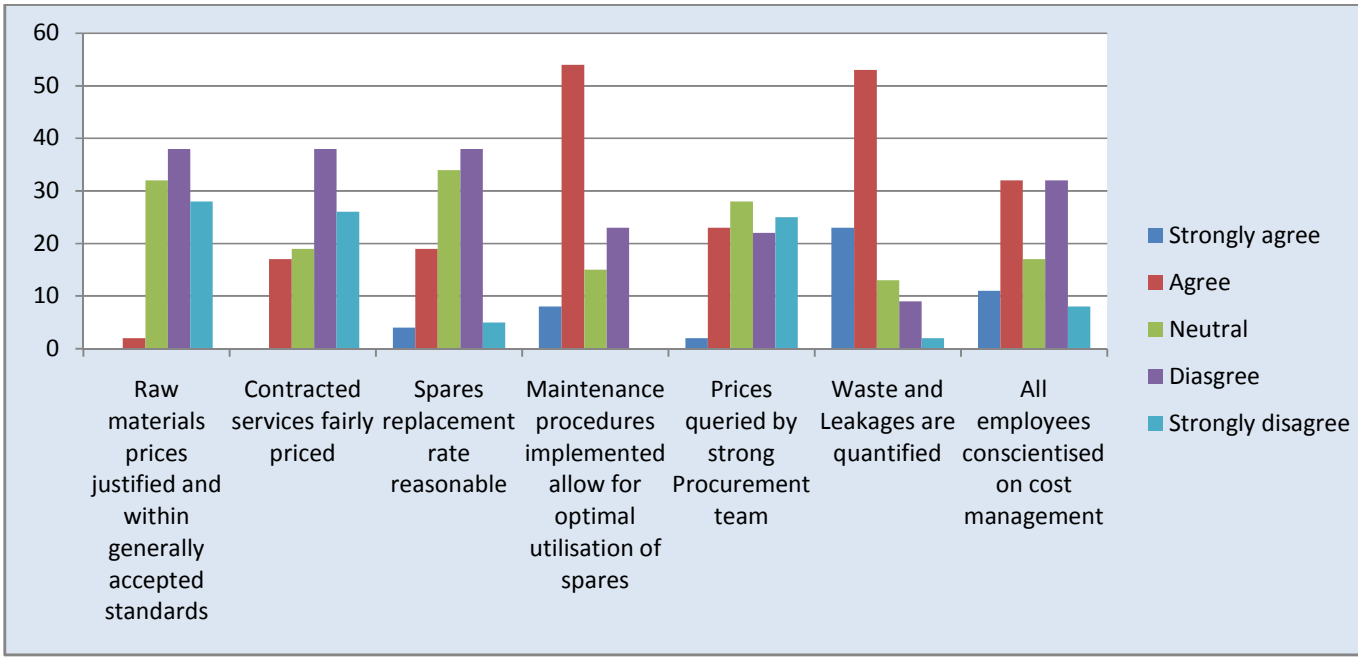

Figure 4.13: Variable costs perception

Figure 4.13 shows an overview of the findings. Analysis of these will be done separately in the next few sections but of notable interest is to note such peaks as 62% respondents who agree that the maintenance procedures allow for the optimal utilisation of spares. Though this will be dissected further, the main reason which the employees attributed to their response was the introduction of Asset Management principles in 2010 through the previously mentioned MANWAY. This has seen a tremendous improvement in the plant's effort to migrate from breakdown maintenance to preventive maintenance procedures. To aid also to this was the introduction of computerised maintenance management system, COSWIN 7i that has seen the integration of maintenance activities into CMMS. There is also a 75% portion of respondents that agree to the idea that waste, losses and leakages are being quantified. This was justified by the fact that losses such bottle breakages, beer losses, effluent discharge, electricity and water usages overruns, among other losses are some of the important key performance indicators reported and discussed at executive level. These are normally calculated as a 'percentage to cost of sales' therefore have a direct impact into the performance and profits of the organisation.

4.5.1 Raw materials costing

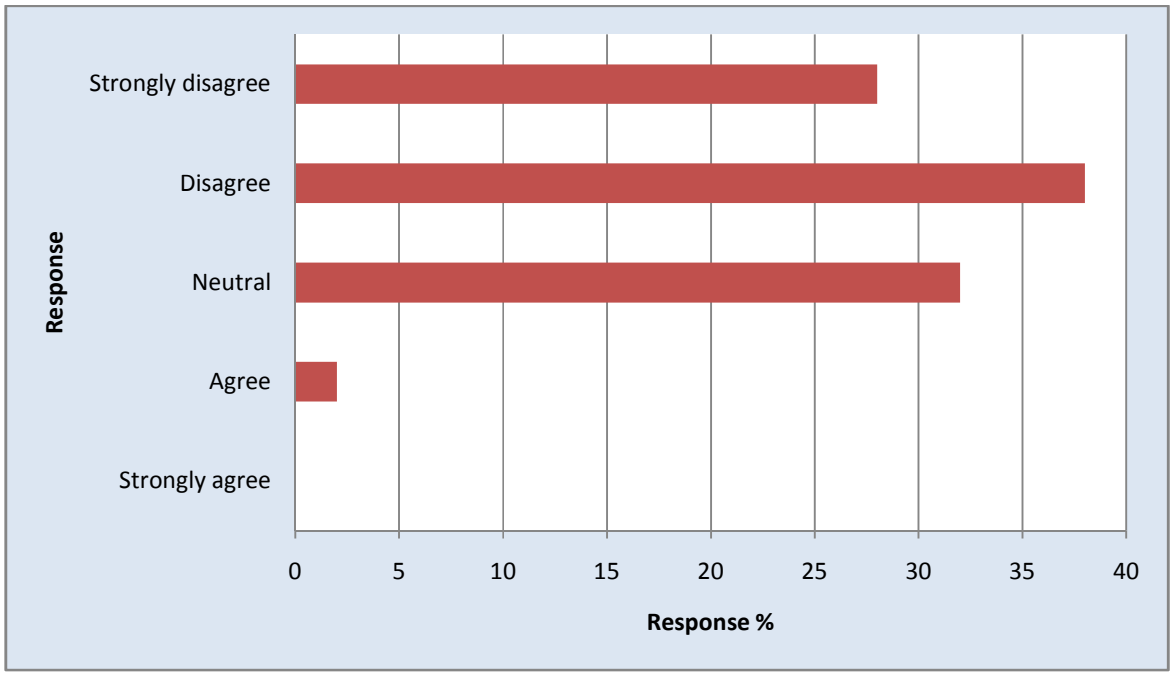

Figure 4.14: Raw materials fairly cost

From Figure 4.14, the respondents demonstrated their lack of confidence in the pricing of raw materials being used by the brewery. About 28% strongly disagree, 38% disagree while 32% remained neutral. Only 2% are confident that the prices which the company is being charged are fair. This mainly applies to the materials locally purchased in which case employees perceive that local prices are always inflated unreasonably. This is related to the outcome on the question of whether prices are queried by the procurement team. 75% disagree with the belief that prices are being queried by the procurement team. Hence the need to address this question so as to get fair prices for the raw materials. This can further be verified with the aid of secondary data which will give a first-hand information to the prices the company is being charged.

4.5.2 Contracted Services costing

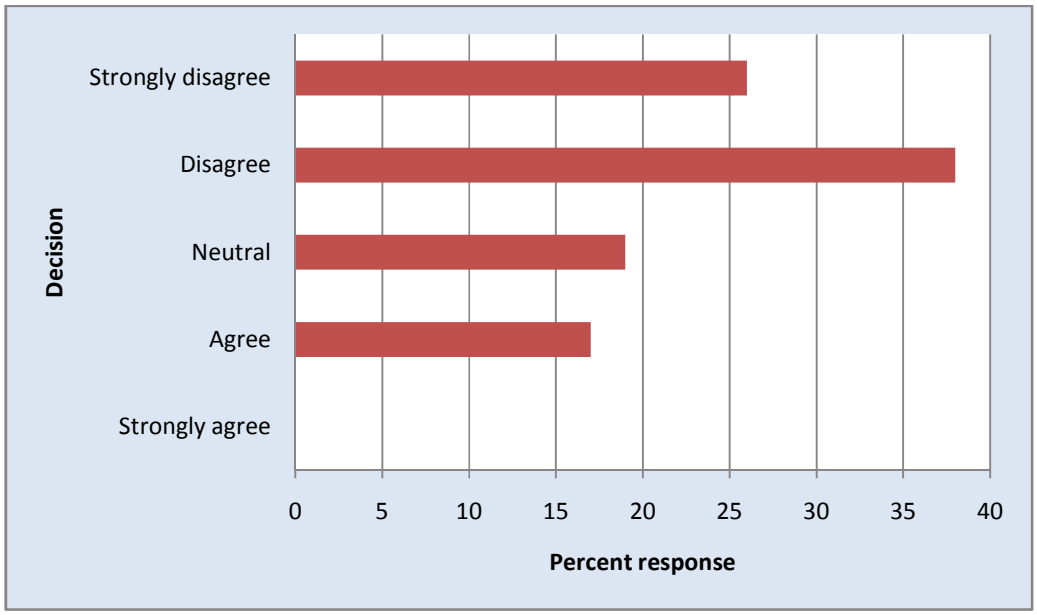

Figure 4.15: Contracted works are fairly cost

As seen on Figure 4.15, 83% of respondents also did not agree that contracted works are fairly priced. On following up through interviews, respondents unanimously agreed that contractors overcharge on their services because of the belief by Contractors that Delta Beverages is a blue chip company and can pay whatever amount is charged. There is need to stick to seeking three quotations per every service to be provided so as to increase the level of competition. It is also incumbent upon the Project Managers and Engineers to thoroughly query the charges by contractors.

4.5.3 Cost Management Awareness

As shown on Figure 4.16, responses to this question are almost symmetrical, with 43% agreeing that employees are aware of the costs impact, 42% disagreeing and the remaining 15% being neutral. This just reveals an opportunity that exists within the company to conscientise employees on cost management. The percentage can become decent if it is pushed to at least 80% therefore more awareness is thus

necessary on this aspect. By doing the awareness, the issues in the above sections for raw materials and contracted prices that are being overcharged can then be challenged. Empowering middle management and supervisors on this aspect can go a long way in dealing with price negotiations since they are normally the first line of defence.

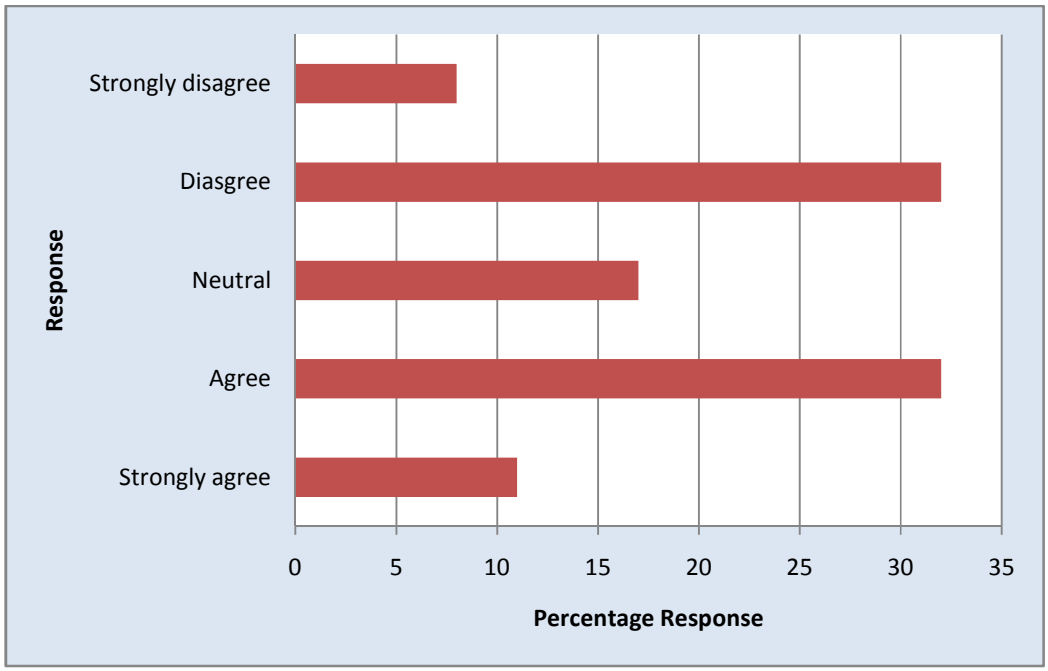

Figure 4.16: All employees were conscientised on cost management?

4.6 Spares Optimisation

Engineering materials management plays a very important role in the maintenance and repairs of plant equipment. As such, it is always important to ensure adequacy or availability of critical spares so as to minimise stoppages due to unavailability. This also means that the stock holding process should be effectively monitored by a system that is reliable, integrating information systems and human effort. The quality of the spares need not be compromised so as to avoid reworks caused by poor quality replacement spares.

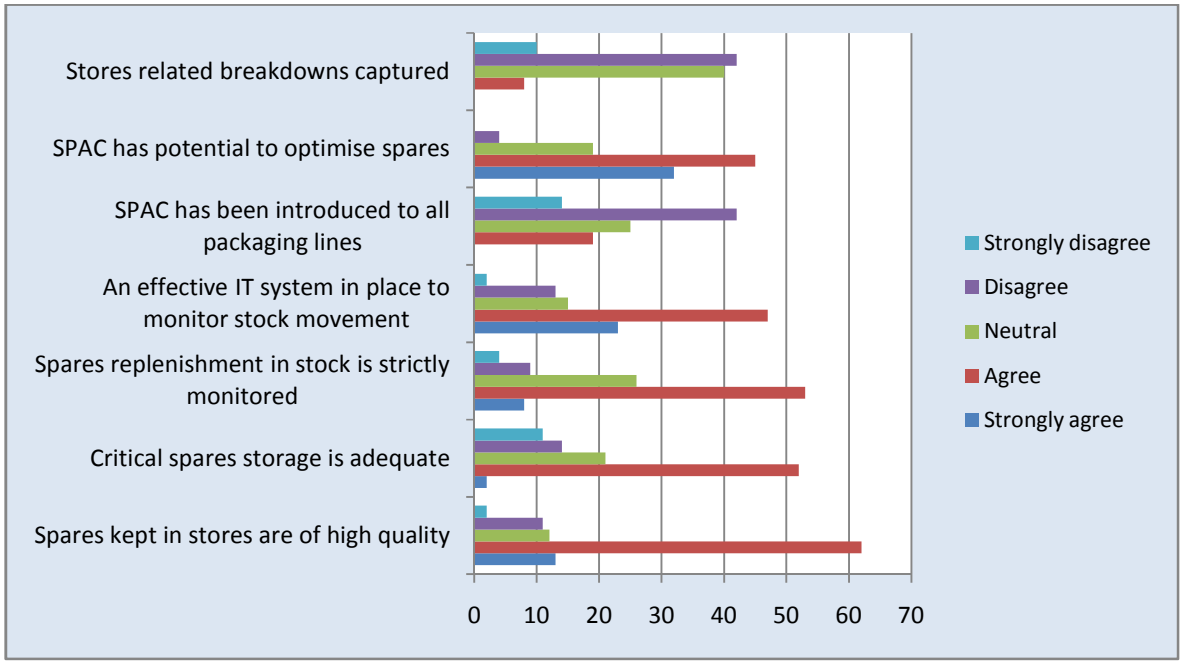

Figure 4.17: Spares Optimisation System

All these matters have been addressed in the questionnaire and responses are as shown in Figure 4.17. A look also into a new and modern spares optimisation proposal by manufacturers of the packaging equipment, known as Krones, has also been done. The concept is abbreviated SPAC and though it is a fairly new concept that has been proposed, it was necessary to check on the extent to which it has gone and also the perceptions on its effectiveness in spares optimisation. In the responses, there are noticeable percentages for employees who remained neutral. These are mainly from none engineering sections that are not so privy to what will be happening within the departments. These include Warehouse and administration, human resources, IT, Sales and Marketing,

4.6.1 Quality of Spares in Stock

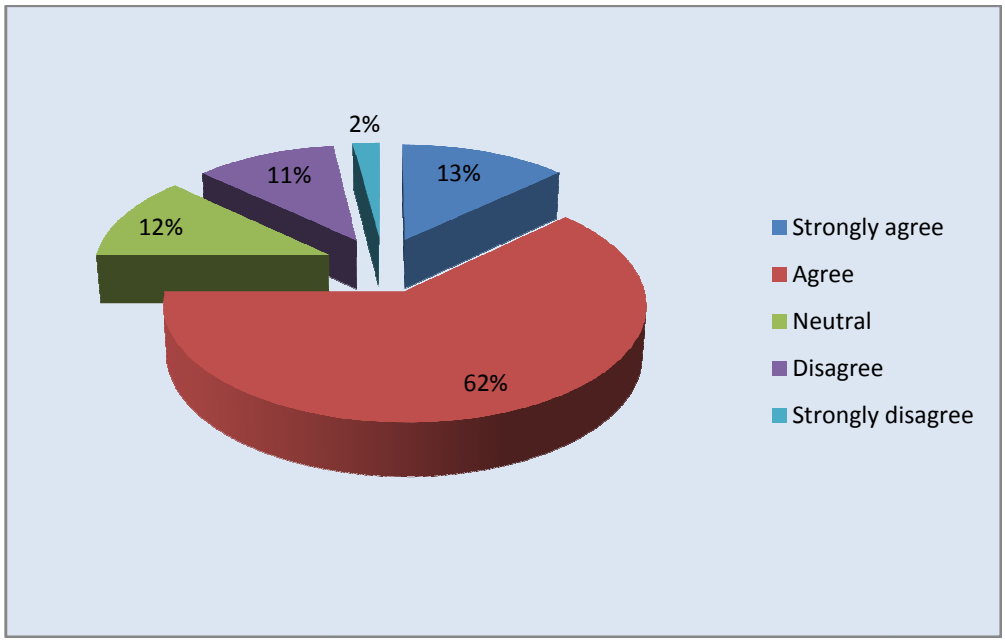

Figure 4.18: Spares kept in stores are of very good quality

The respondents shared their views in terms of quality of supplied spares that get into stores. From the responses on Figure 4.18, it is worth noting that 75% of the respondents agree that spares that are kept in stores of good quality. On further verification from secondary data and interviews to get an understanding on why 75% of the employees believe that the spares are of good quality, the researcher noted that 63% of the stock holding was from packaging department and these are from the Original Equipment Manufacturer (OEM). Naturally, the employees have an inclination towards stamping their confidence on these spares from German Suppliers. The trend also on the ground is that there have not been tangible records of returns outwards due to poor quality. The composition of the spares distribution can be understood if one is to refer to Appendix 4 that shows the stock holding situation at the time of reporting. As shown in Appendix 4, at the time of research, Packaging had a value of $5 203838.98 in stock against a total Engineering spares value of $8 226 487.25. There is also a $1 170 702.36 worth of spares from the decommissioned lines unit 2 and 4.

While 12% of respondents remained neutral, the other 13% are of the view that the spares in stores are not of good quality. These have sited some returns from locally manufacturing companies that mainly supply spares in the Utilities/Engineering and part of the Brewing section.

4.6.2 Monitoring of Spares replacement rate

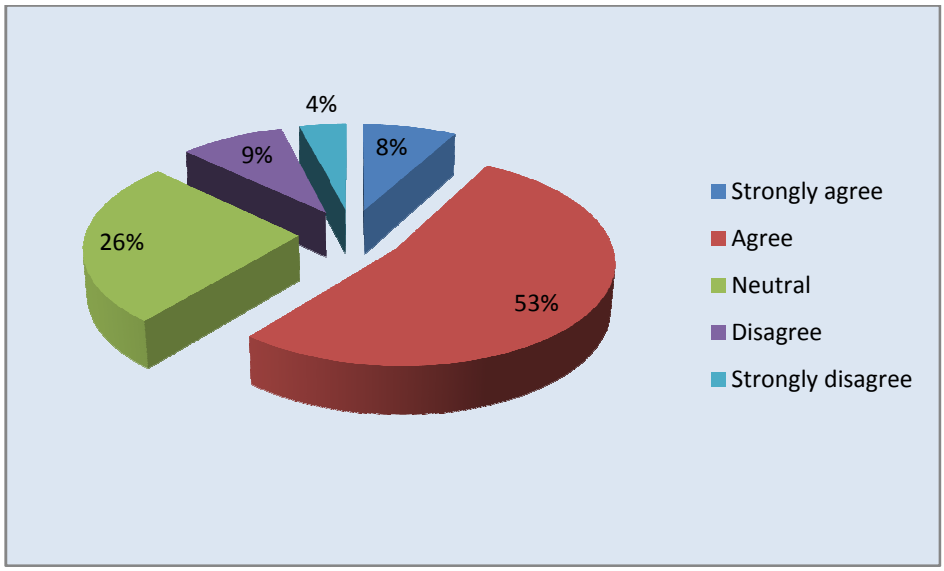

Figure 4.19: Spares replenishment is strictly monitored

As shown on Figure 4.19, 53% agreed that spares replenishment is strictly monitored, while 8% strongly agreed. Only 12% disagree while a significant 26% maintained neutrality. The 61% argued that breakdowns related to unavailability of spares have in the past been minimal. Figure 4.17 shows that 52% of the respondents disagree that stores related breakdowns are captured. The breakdowns ended up not being captured because they have proved to be negligible as compared to the overall downtime for the equipment. The spares replenishment is monitored with a combination of information technology software named SYSPRO and the human interface. From the software, stock movement and levels can be

seen but then it is upon the Stores personnel to do the necessary requisitions for replenishment. The software is just there to assist in decision making.

4.6.3 IT system in Stock controlling

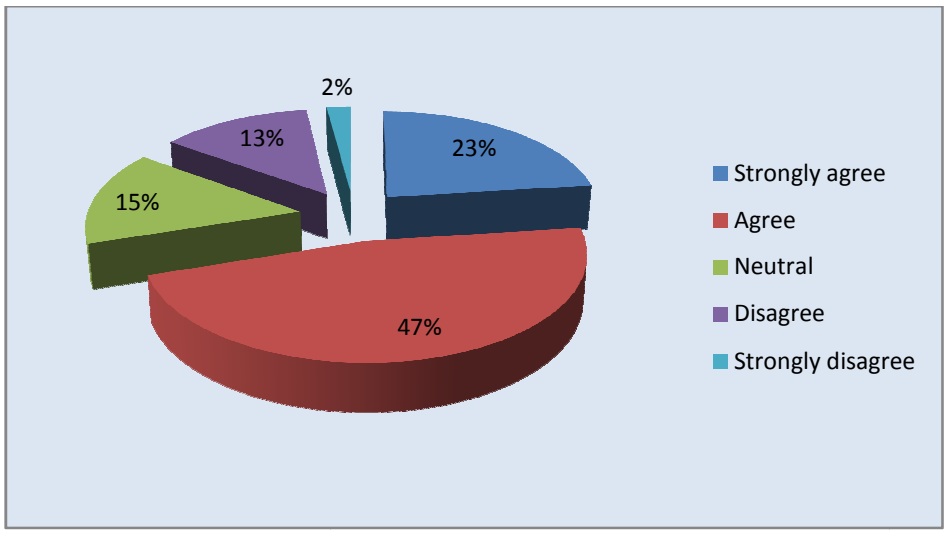

Figure 4.20: An effective IT system in place to monitor stock movement

From Figure 4.20, it is apparent that there is an effective IT system in place to monitor stock movement. This is so because 70% of respondents indicated that an effective IT system to monitor stock movement is in place. The remaining 30% is equally divides between neutrality and disagreement. This concurs with the just ended discussion on stock replenishment being supported by the SYSPRO software in place. How the system works and the major functions used will be deliberated in the chapters to come.

4.6.4 SPAC introduction in Spares optimisation

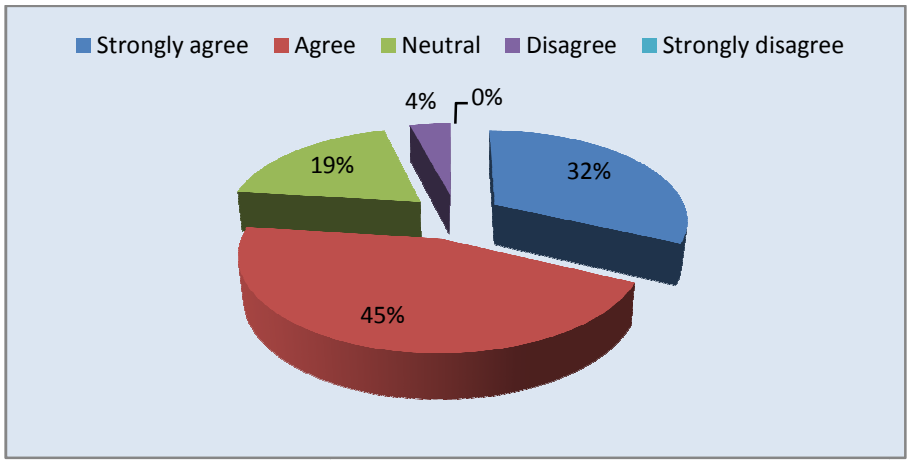

Figure 4.21: SPAC has potential to optimise spares holding

Though the Spares availability concept has not yet been fully launched, but from the presentations and expectations from employees it can be seen that there is so much hope that it will optimise stockholding. From the 77% of the respondents who believe so, the respondents' faith lies in the fact that the proposed spares for keeping in stores are suggested by the OEM. This spares list is what they term as critical spares and are derived from history and also the failure modes across similar SABMiller plants across Africa. Delta Beverages current stockholding has been considered extremely high as money is tied up in stock. As indicated in appendix 4 the stock holding, for packaging section only, at time of presentation was more than $5million whereas the stock holding for Krones stores in South Africa is $2million. Krones stores SA serves the SABMiller plants in Africa hence Delta beverages' stock value is more than double that of Krones. From Figure 4.21, a percentage of 4% do not have faith in SPAC optimising stock holding, while 19% are neutral.

4.6.5 Stores related breakdowns

This section has been slightly discussed in the previous section when a discussion on the spares replenishment was done. From Figure 4.22, only 8% agree that these

breakdowns are captured, 10% strongly disagree, 42% disagree and 40% are neutral.

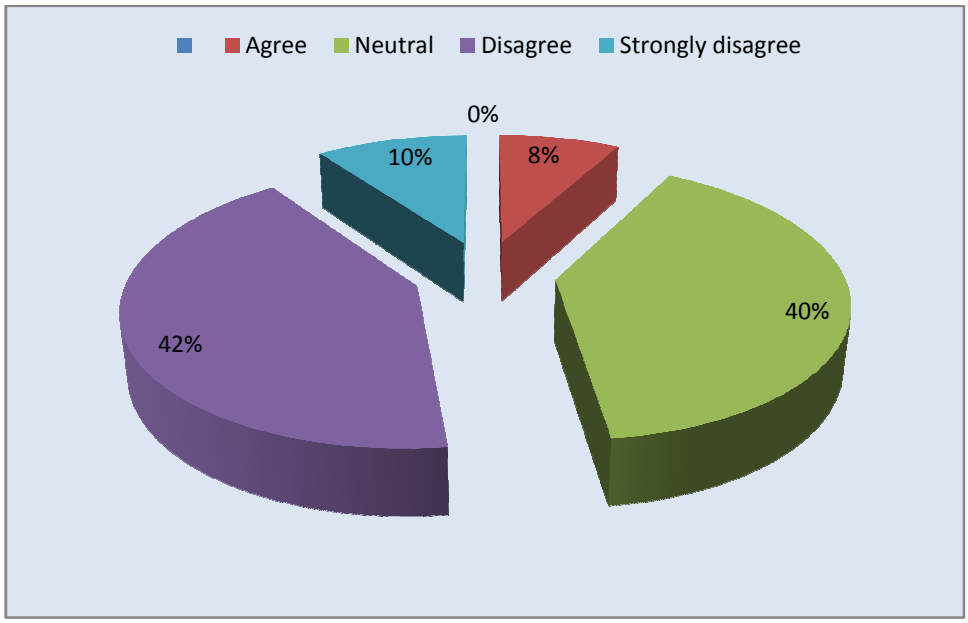

Figure 4.22: Stores related breakdowns are captured.

.As presented earlier on, the researcher discovered that the breakdowns were being captured until such a time that it was discovered that their contribution was not much as a proportion of the total stoppages. It is however advisable to resume with such analysis since it helps in the optimisation of operations. The breakdowns do not only cover only the stock out related stoppages but also those that emanate as a result of process delays due to spares withdrawals.

4.7 Overtime Management

As previously stated that Delta operations are above 90% capacity and the organisation endeavours so much to meet customer demand in terms of quality and availability. Under such circumstances, overtime normally becomes a burden to the organisation if not well managed. In worst case scenarios, it does contribute much to the overheads such that benefits accrued from increased productivity might be wiped out by this ‘monster’. Given this background, the researcher also probed into

this. Though much of the information will be demonstrated by the facts and figures of what was discovered on the ground, it became also a noble cause to understand the employees' perceptions on this matter. The findings are presented in figure 4.23 and discussions related to that proceed thereof.

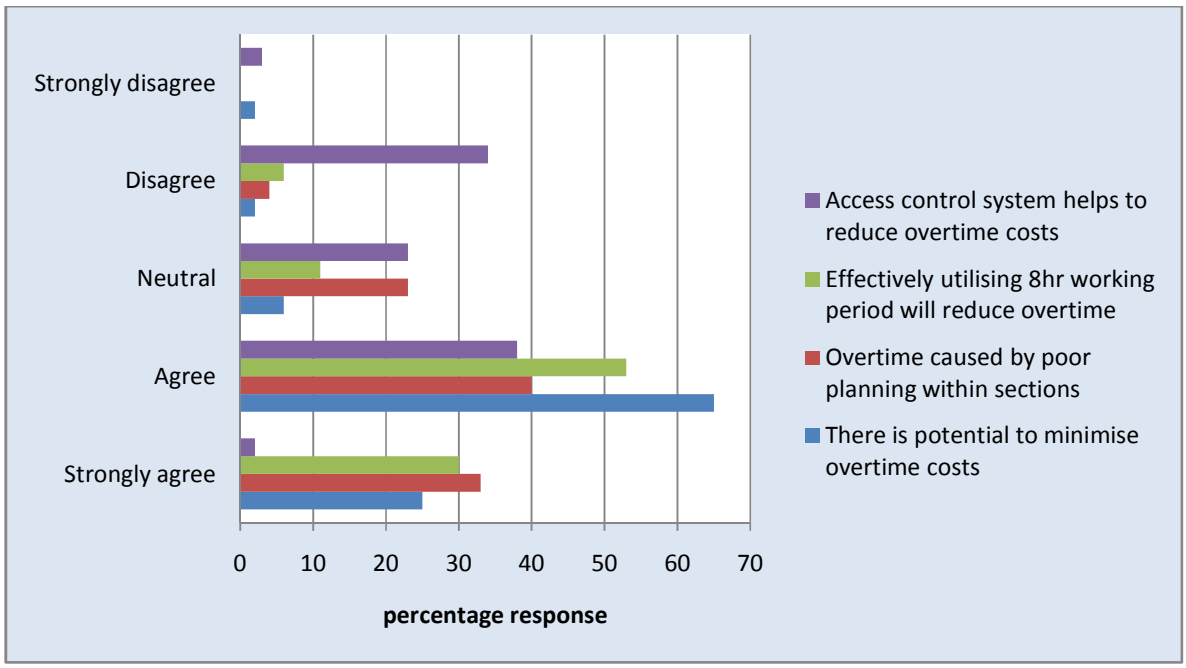

Figure 4.23: Overtime management

4.7.1 Overtime reduction potential

The respondents indicated that there is a great opportunity to cut down on the current overtime levels at the plant. This was echoed by 90% of the respondents, with 6% being neutral and 4% disagreeing. The major factor attributed to overtime exceeding limits is poor planning as shown in figure 4.25. Effective maintenance procedures will also result in overtime reduction since the operations will move from breakdown mode to scheduled maintenance that is more focused and organised. Fire fighting as a result of incessant breakdowns results in high costs, confusion and low employee morale. With the drive to implement best asset care practices and autonomous maintenance, mileage can be gained as far as the reduction drive is concerned.

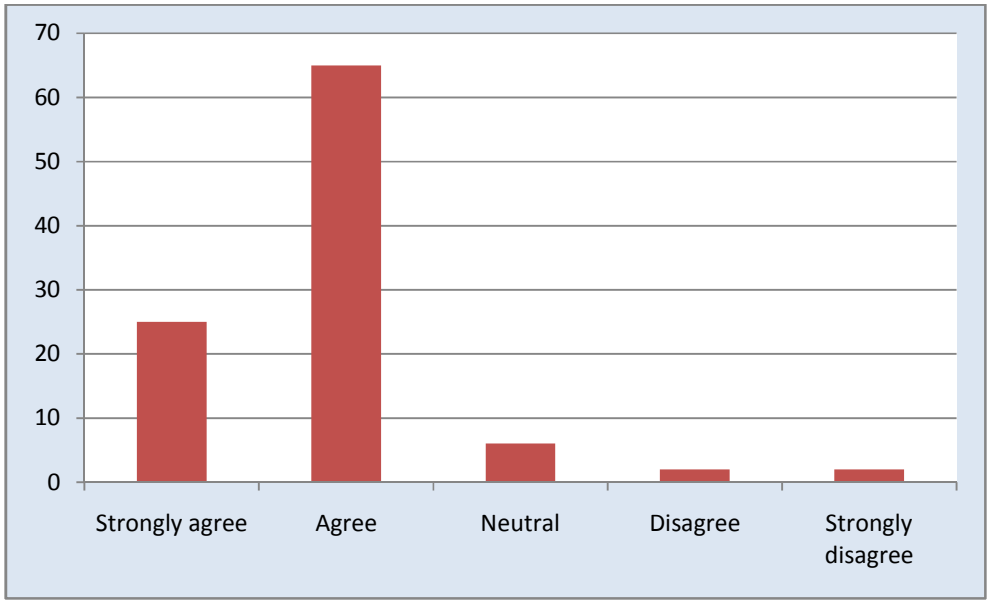

Figure 4.24: Potential to reduce overtime

4.7.2 Overtime as a result of poor planning?

Since 73% responded that overtime experienced at the organisation can be attributed to poor planning, there is an opportunity to reduce it by proper planning. This can also corrected by seeking prior approval from top executive before employees engage in overtime. Survey has indicated that some of the jobs that have been done as overtime could be done during normal operating hours. This is why 83% of the respondents have indicated that overtime can be greatly reduced if employees effectively utilise their 8hour normal operating hours. This calls for enforcement in supervision and also implementing monitoring techniques such as time sheets to ascertain artisan utilisation. As shown on Figure 4.25, only 4% disagree that overtime is a result of poor planning and 23% remained neutral.

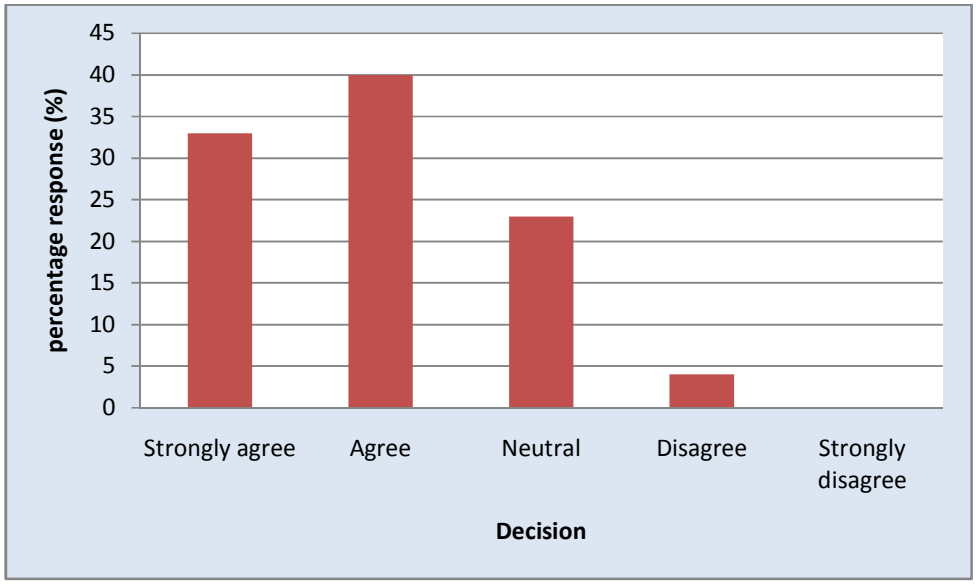

Figure 4.25: Overtime a result of poor planning

4.7.3 Access Control System versus overtime

There were mixed feelings over the impact of access control system on reducing overtime. Though the system is still on commissioning stage, 37% of the respondents do not agree that it will have a direct influence on the overtime issue whilst 40% think otherwise. This resembles a 50-50 situation. The remaining 23% decided to remain on the neutral line concerning the subject. Those who agreed argued on the basis that the access control system will be used for time and attendance. This in turn will be connected to employee's salaries at the end of month, hence employees will be forced to be at their workplace, else will be marked absent. However, the 37% who argue otherwise are of the opinion that without enough supervision, the employees will be at their workplace but effectively being unproductive. These findings are graphically shown on Figure 4.26

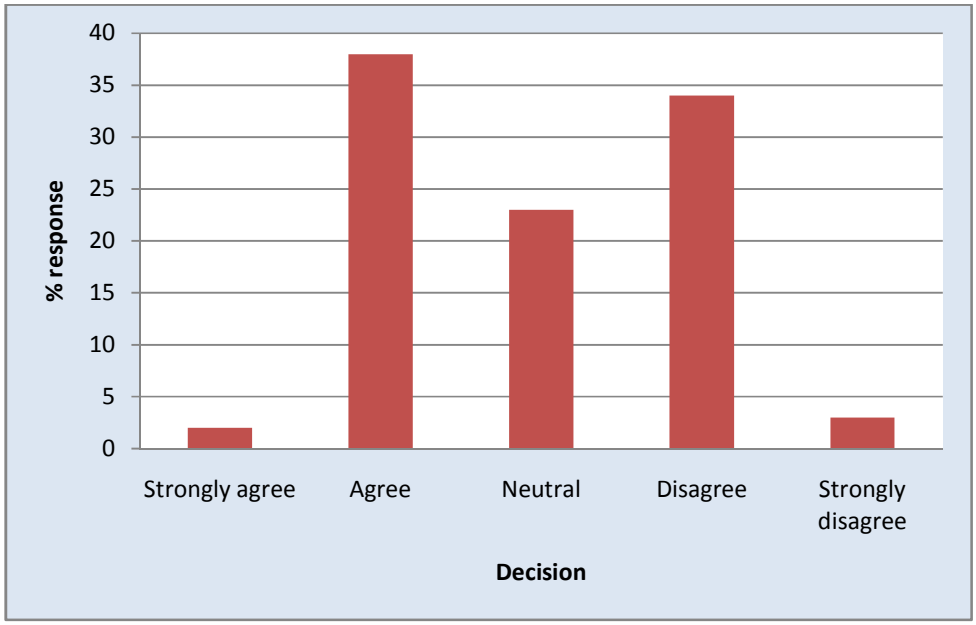

Figure 4.26: Access control in reducing overtime

4.8 Secondary data and Interview responses from Middle Management

In this section, specific responses gathered from the interviews conducted on middle management team at Delta Beverages are analysed. Secondary data collected within the sections is also dealt with so as to buttress the discussion on effective cost management. Secondary data will be used to discuss the as-is analysis hence it gives a picture of the trends related to the subject. The middle managers to top management were selected exclusively because they understand the subject of cost management far much better than the non-managerial staff. Hence they have a distinction to speak from a more informed position. The non-managerial employees were therefore not included in the sample for reasons that the interview questions were more strategic in nature than tactical. The hypothesis that was proposed in the first chapter will also be tested using findings from this section. Appendix 3 was used as a guide to the interview questions and the interview targeted all sections of the value chain so as to have a holistic approach.

4.8.1 Value chain and strategic cost management

The interviews conducted across the value chain showed that all the managers in the different sections understood their role in chain and how they contribute to the overall costs of the company. This knowledge will enable the organisation to effectively implement target costing as has been explained in Chapter 2. Freeman (1996) defined target costing as a management method that allows firms to provide customers with products that they want, at the right time and affordable prices but still earning adequate financial returns. Once each section plays its part in the process then customer demand can be met on time and at the expected quality thus feeding into the financial returns of the organisation. Procurement department expressed a high level understanding of their role in purchasing good quality raw materials since that is the starting point for the beer brewing process. Finance department should support the whole system by timely authorisation of purchases. The Brewing, Engineering and Packaging sections expressed also an outstanding knowledge on the need to monitor quality at each and every stage of the process, being supported by the quality assurance department. This department is there to ensure that products that do not meet the required quality standards as per set targets do not get into the market.

Warehousing, Freight and Distribution provide outbound logistics and they will be required to that well in time. They are there to ensure that product gets into the market in time. Sales and marketing are always on the environment scan, checking market trends, demand forecasting and feeding back into the system in a reverse direction, that is, production until it reaches procurement to determine the quantities required. Cutting across all these sections is the IT and Human Resources department that provide support services as enablers. IT ensures that the processes involved are well integrated into the information systems for speed, easy retrieval, secure storage and transcations.

4.8.2 SYSPRO use in Cost Management

The previous discussion on stock movement in the questionnaire pointed to responses that there is an IT system in place to monitor movement. Figure 4.27 shows an extract of the IT system. Most importantly, this software shows all the costs movement across the functions. It has also become very useful in monitoring maintenance costs in the plant, for Brewing, Packaging and Utilities sections. The extract below, for example, shows the high cost items for the selected period. The periods are spread into twelve and the Delta financial year runs from April to March the following year. For example the extract is for the Brewing repairs and maintenance account and it is showing that for period 11 (at time of extract), the Section had used a $79 586.48 against a budget of $38 000.00. According to this extract, the highest withdrawal was on 15 February 2013 that is Buhler mill spares for $37 575.79. These are the figures that contribute much into the maintenance cost per HL hence will have to be monitored carefully since in the first chapter, the researcher pointed out that a saving of $1/Hl increase yearly profit by approximately $1.4million. Graphical trends in the maintenance cost per HL will be presented as the discussion progresses.

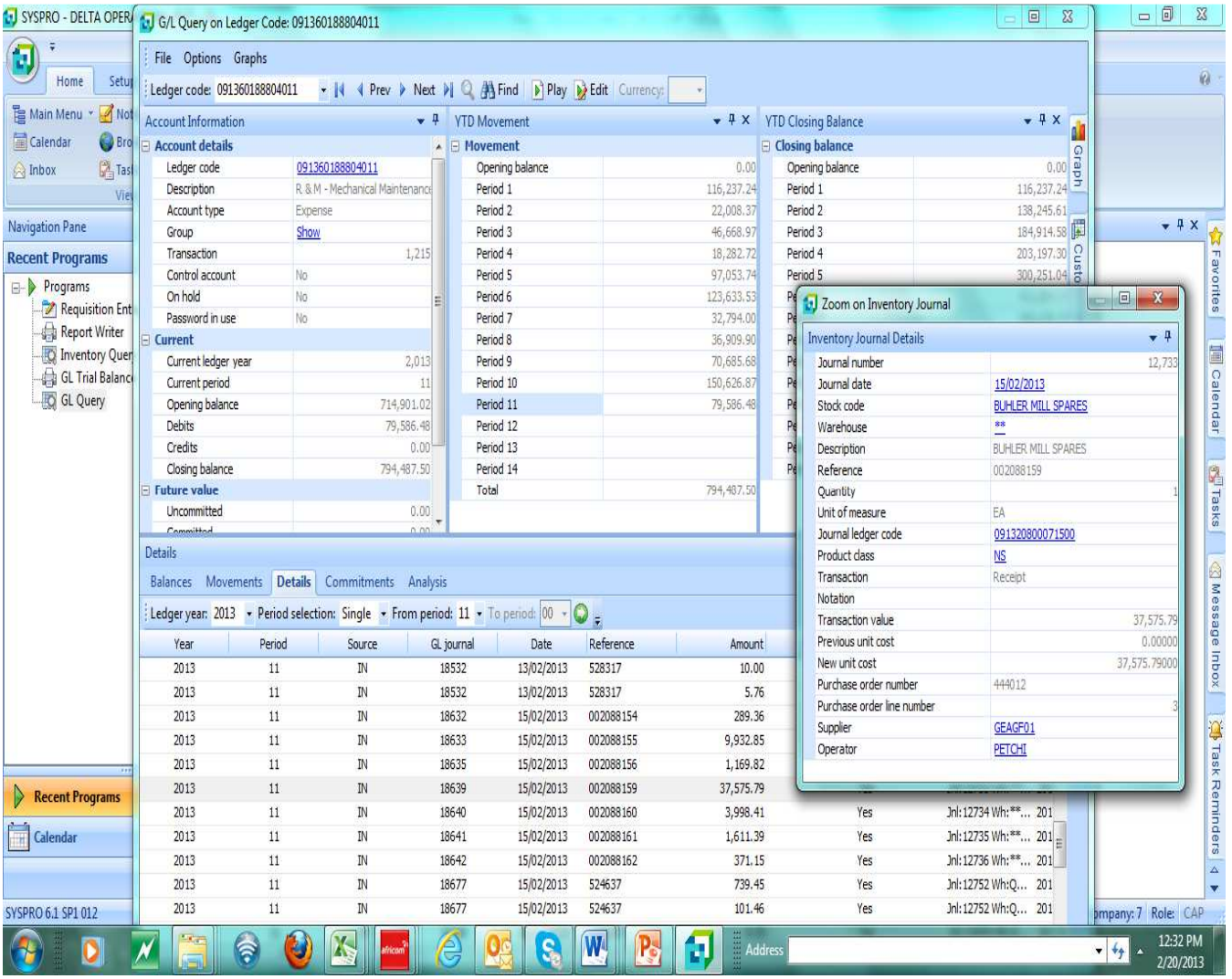

Figure 4.27: SYSPRO in cost management

4.8.3 Cost Management Practice in Departments

The interview guide also explored on how cost management is practised within the departments. The respondents understood and practice what Robert (2006) postulated when he said that 'Cost management is a management function responsibility, and must be performed by teams using recordable and repeatable methodologies'.

He further on highlighted that effective cost management requires involvement and interaction between many individuals at different levels having different roles and skills. It demands that all persons employing management methodologies interact in a synergistic fashion. This is the case with Delta Beverages where management teams from various functions meet every week in Finance Management committee meeting to discuss about cost management techiniques and strategies. The organisation empoys a top down approach to cost management and awareness thereof is done at every level to understand the importance of managing costs. There is a direct relationship also between cost management and strategy formulation and implementation. All the strategic decisions considered by the Company are cost sensitive as they take the impact of cost drivers in place.

4.8.4 Cost Drivers.

In Chapter two, George (2012) pointed out that in order to have an effective management system an organisation needs to have an understanding of the cost drivers. The researcher thus took a step into exploring the major cost drivers for Delta Beverages so as to have a focused target on addressing the issues of cost. A broader overview of these have been highlighted in Chapter one when the researcher stated that the main components of TCM are Controllable Fixed Costs (CFC), Variable costs (VC), Depreciation and Maintenance costs. A look into how each of these affects the various departments and the opportunities of saving in each section will be discussed in the next few chapters.

4.8.5 TCM Composition

Month on month the total cost of manufacturing for the plant is calculated and the input then feeds into the Profit and loss account. The profit and loss extract is as shown in Appendix 5, which was as at end of January 2013.

Table 4.2: Summary of TCM contributing factors for the plant (Oct 2012 extract)

Header	Expence Description	Description	Brewing	Engineering	MDM	Packaging	Plant Manager	Production Services	Quality Control	Site	Grand Tota
Comodity Costs	Adjuncts	1870 - Usage - Sugar	120,935.13	--	--	--	--	--	--	--	120,935
		1875 - Usage - Hops	34,243.96	--	--	--	--	--	--	--	34,243
		1877 - Usage - Sorghum	40,446.93	--	--	--	--	--	--	--	40,446
		1935 - Usage - Maize	319,789.36	--	--	--	--	--	--	--	319,789
	Malt	1860 - Usage - Barley Malt	1,336,823.56	--	--	--	--	--	--	--	1,336,823
	Other Commodity Costs	1655 - Cost of Sales - Lager Local Ca	1,020,362.97	--	--	--	--	--	--	--	1,020,362
		1665 - Cost Of Sales - Lager Draught	8,730.47	--	--	--	--	--	--	--	8,730
		1682 - Cost of sales - Eagle Lager	158,740.63	--	--	--	--	--	--	--	158,740
		1760 - Cost of Sales - WIP	(4,339,314.84)	--	--	--	--	--	--	--	(4,339,314
		1846 - Cost of Sales - Other	5,413,565.38	--	--	--	--	--	--	--	5,413,565
		Adjustment - 1846	(461,139.00)	--	--	--	--	--	--	--	(461,139
			(250,000.00)	--	--	--	--	--	--	--	(250,000
	Packaging material	2100 - Crowns	--	--	--	155,138.72	--	--	--	--	155,138
		2145 - Packaging Costs - Cans	--	--	--	495,038.02	--	--	--	--	495,038
		2155 - Labels	--	--	--	254,532.96	--	--	--	--	254,532
		2300 - Breakages - Bottles	--	--	--	104,597.00	--	--	--	--	104,597
		2310 - Bottle Breakages Scuffing Pro	--	--	--	(46,278.40)	--	--	--	--	(46,278
		2312 - Breakages/Missings	--	--	--	(6,703.60)	--	--	--	--	(6,703
		2320 - Losses - Crates Destroyed	--	--	--	17,606.40	--	--	--	--	17,606
		2350 - Losses - Blending Ferment	(2,130.50)	--	--	--	--	--	--	--	(2,130
		2355 - Losses - Ferment Beer	14,458.88	--	--	--	--	--	--	--	14,458
		2360 - Losses - Packaging Beer	--	--	--	--	--	--	--	(27,220.83)	(27,220
		2370 - Losses - Storage Beer	44,401.47	--	--	--	--	--	--	--	44,401
		2110 - Packaging Costs - Usage NRBS	--	--	--	8,648.83	--	--	--	--	8,648
		2080 - Packaging Costs - Usage Shrink	--	--	--	(5,433.80)	--	--	--	--	(5,433
		1880 - Usage - Manufacturing Sundry 1	--	--	--	152,560.16	--	--	--	--	152,560
	Manufacturing Sundries		124,960.97	--	--	--	--	--	--	--	124,960
Comodity Costs Total			**3,584,875.37**	**--**	**--**	**1,129,706.29**	**--**	**--**	**--**	**(27,220.83)**	**4,687,360**
Fixed Costs	Admin and operating		894.19	5,514.28	319.87	1,477.04	5,647.85	660.68	1,236.19	3,394.40	19,144
	Bonus		16,842.33	2,901.68	1,096.12	34,473.00	--	4,604.38	10,908.00	--	70,825
	Buildings		--	--	--	--	25,093.40	--	--	--	25,093
	Depreciation - plant vehicles and systems		--	--	--	--	1,942.17	--	--	82,289.49	84,231
	Maintenance		65,213.30	231,072.73	660.00	123,406.21	1,340.00	2,914.41	5,473.06	157,907.00	587,986
	Manning		10,375.37	17,009.28	297.12	29,461.50	6,573.54	3,462.00	4,327.62	1,810.28	73,316
	Municipal taxes		--	8,145.06	--	--	--	--	--	--	8,145
	Permanent staff - overtime	6280 - Salaries - Overtime	6,392.56	5,594.15	--	8,804.84	--	687.69	4,103.20	--	25,582
		6445 - Wages - Overtime	8,652.55	6,156.98	--	20,832.07	23.60	393.02	300.00	--	36,358
	Permanent staff - pension		5,011.01	5,794.19	220.54	10,242.88	138.54	960.06	2,164.37	--	24,531
	Permanent staff - salary and allowances		32,899.17	59,858.90	1,415.85	52,259.97	713.90	6,709.30	21,077.34	--	174,934
	Permanent staff - social security		754.86	985.98	6.00	2,005.12	19.83	127.98	150.96	--	4,050
	Permanent staff - wages		11,860.15	12,941.99	--	35,853.62	350.00	2,661.00	2,003.96	--	65,670
	Temp Staff		7,283.50	550.00	--	15,161.09	--	--	--	--	22,994
	Training		--	--	612.17	720.00	--	--	--	476.20	1,808
	Travel, accommodation and entertainment		4,747.65	6,838.86	--	11,738.24	1,215.00	1,063.00	3,485.45	4,909.90	33,998
Fixed Costs Total			**170,926.64**	**363,364.08**	**4,627.67**	**346,435.58**	**43,057.83**	**24,243.52**	**55,230.15**	**250,787.27**	**1,258,672**
Income from Products	Income from Products		--	--	--	--	(31,256.05)	--	--	--	(31,256
Income from Products Total			**--**	**--**	**--**	**--**	**(31,256.05)**	**--**	**--**	**--**	**(31,256**
Utilities	Electricity	2285 - Utility costs -Electricity	--	179,067.18	--	--	--	--	--	--	179,067
	Other Variable Costs		--	(62,609.55)	--	--	--	--	--	--	(62,609
	Steam		--	163,639.48	--	--	--	--	--	--	163,639
	Water		--	119,542.42	--	--	--	--	--	--	119,542
Utilities Total			**--**	**399,639.53**	**--**	**--**	**--**	**--**	**--**	**--**	**399,639**
Grand Total			**3,755,802.01**	**763,003.61**	**4,627.67**	**1,476,141.87**	**11,801.78**	**24,243.52**	**55,230.15**	**223,566.44**	**6,314,417**

A discussion with the Finance team revealed that the major cost drivers, as in Table 4.2, comprise of;

- Controllable Fixed costs, mainly payroll, maintenance costs, administration and operating costs;
- Utilities costs;
- Depreciation; and
- Variable costs, mainly consisting of raw materials costs such as Maize, Sorghum, Hops, Barley malt, Sugar, Cans, Bottles, Labels, Glue and Crowns.

The target to reduce TCM across the value chain should therefore focus on minimising the above overheads so as to increase on the EBIT.

Variable costs can be managed through the right product mix and optimising the processes so as to minimise on usages and minimising losses such as bottle breakages, can bodies damages, beer losses in the process and so on. The pricing of these materials is also critical hence an interview with the Procurement team indicated that supplier partnering and bulk purchases can improve the bargaining power of Delta Beverages. Payroll costs can be managed through organisational design rationalisation and monitoring overtime. Administration and operating expenses are mainly incurred in the Sales and marketing department hence route to market planning has been identified as key to rationalise operations.

The survey also revealed that the monthly charges for water usage, electricity usage and effluent disposal charges are exorbitant. The usages can be addressed through sustainable development projects. Effluent charges mainly emanate from city council penalties on contamination, by and large contributed by yeast disposal. Depreciation hits the organisation most when new equipment is purchased for example the recently purchased new packaging line since provisions for depreciation are huge at first, then diminish with age. Maintenance costs will be described in more detail later on in the discussion. Table 4.3 shows the components of the Total cost of Manufacturing for F13 period. The graph on Figure 4.28 also shows a comparison of

the trend from F12 to F13 between Southerton and Belmont Plant and how the target for Southerton shifted$45 in F12 to $42.5 in F13. Generally the TCM for Belmont is on the lower side compared to Southerton plant hence the desire to always benchmark and meet the targets.

Table 4.3: F13 TCM summary sheet (2012-2013)

FINANCIALS		F13 TCM Summary (2012-2013)									
CONTROLLABLE FIXED COSTS (CFCs)		April	May	June	July	August	September	October	November	December	January
Total Pay Costs	US$	383,898.00	635,934.00	474,886.00	455,666.00	393,752.00	379,725.00	424,948.00	512,710.00	402,661.00	416,880.00
Total Maintenance Costs	US$	201,380.09	114,062.54	116,392.98	150,447.69	291,145.34	330,213.28	295,690.31	203,378.09	284,448.09	302,196.38
Other CFCs	US$	617,358.88	499,325.47	513,068.00	384,067.31	379,610.66	429,110.72	538,034.69	513,099.91	465,391.66	564,877.63
Total CFCs	US$	1,202,637.00	1,249,322.00	1,104,347.00	990,181.00	1,064,508.00	1,139,049.00	1,258,673.00	1,229,188.00	1,152,500.75	1,283,954.00
BALANCE SHEET ITEMS											
Stock Level - Raw Materials	US$	4,999,569.00	6,206,311.00	5,829,389.00	5,980,322.00	6,423,727.00	7,592,740.00	7,654,423.00	8,390,986.00	8,088,381.00	8,439,664.00
Stock Level - W I P	US$	1,561,851.00	1,655,812.00	1,599,770.00	1,407,093.00	1,576,221.00	1,658,798.00	1,514,642.00	1,839,587.00	1,949,592.00	1,954,626.00
Stock Level - Finished Product	US$	3,496,463.00	3,090,683.00	3,707,311.00	3,328,165.00	3,277,272.00	3,627,342.00	2,737,890.00	4,291,437.00	4,056,345.00	4,281,545.00
Stock Level - Engineering Spares	US$	9,024,161.00	9,026,259.00	10,975,817.00	7,772,214.00	8,016,285.00	8,067,867.00	8,131,789.00	8,030,631.00	8,129,526.00	8,226,487.00
Depreciation (Production assets)	US$	140,014.00	114,268.00	109,701.00	109,616.00	109,286.00	94,243.00	84,232.00	84,570.00	84,084.00	84,053.00
VARIABLE COSTS											
Total Variable Cost of Production (ex. Regional	US$	4,013,582.00	3,541,548.00	3,851,384.00	3,773,929.00	3,672,097.00	4,064,600.00	4,937,000.00	4,544,422.00	5,052,091.00	3,650,485.00
Total Income from by-products	US$	11,743.00	17,500.00	20,618.00	37,040.00	33,766.00	25,772.00	31,256.00	34,014.00	47,125.00	6,745.00
Financial Month end Production volume for TCM	HL							141,021.00	134,252.00	145,462.00	112,627.00
TCM - Total Manufacturing Costs	US$	5,204,477.00	4,773,370.00	4,935,114.00	4,727,070.50	4,702,839.00	5,177,876.00	6,164,417.00	5,739,596.00	6,157,467.50	4,927,694.50
TCM - Theoretical Total Manufacturing Costs for	US$	10,408,954.00	9,546,740.00	9,870,228.00	9,454,141.00	9,405,678.00	10,355,752.00	6,709,528.00	6,181,297.50	6,411,483.50	5,364,077.00
TCM - Total Manufacturing Costs	**US$/hl**	**42.29**	**44.77**	**41.70**	**43.95**	**38.87**	**38.71**	**43.71**	**42.75**	**42.33**	**43.75**

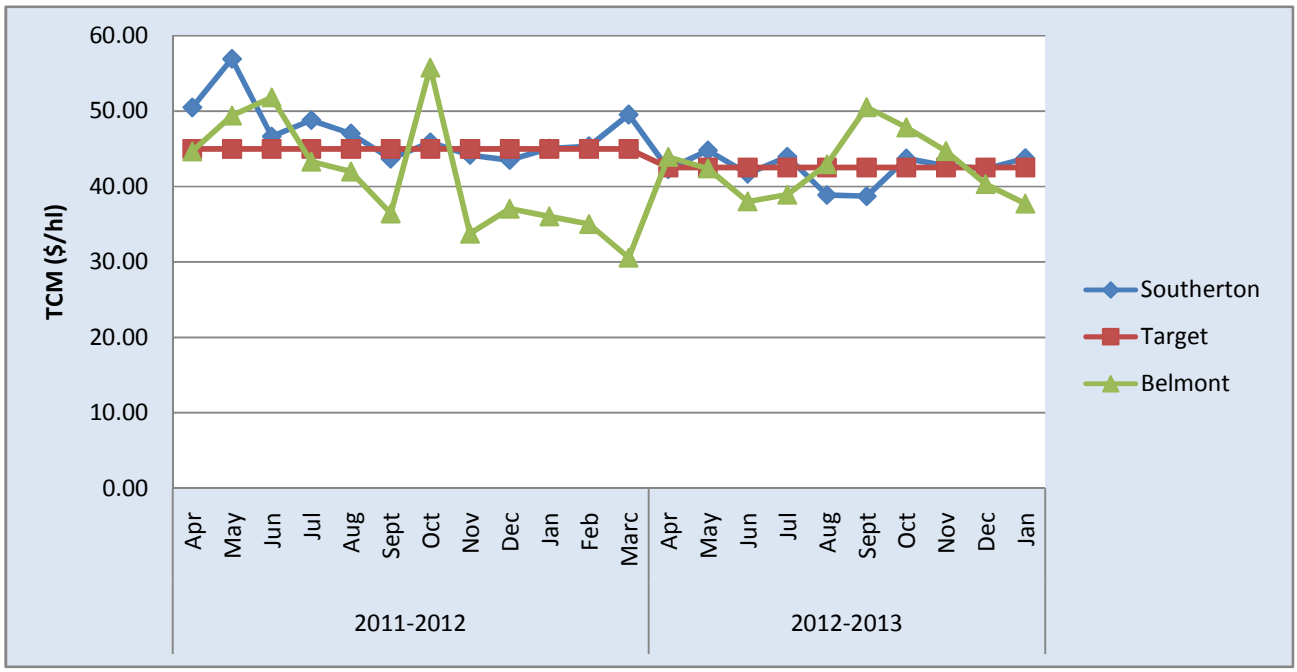

Figure 4.28: TCM trend from 2011-2013-A comparison with Belmont plant

4.8.5.1 Maintenance costs:

These are the costs related to overhauls, repairs and service of equipment in the production areas mainly Brewing, Utilities and Packaging. Therefore the major contributor of this is spares usages and withdrawals. These costs have a direct relationship with the level of Asset Management practices in place. The higher the breakdowns the greater the spares replacement and consequently the bigger the maintenance costs. The researcher drilled into the trend of these costs for the plant in the year 2011-2013. Figure 4.29 shows the trend in the maintenance cost/HL for the two financial years, F12 and F13. As can be seen from the graph, the initial target for F12 was $3.5/HL. The actual started on a bad note but with the launch of MANWAY in October 2011, good asset care practices became in place and this resulted in a decrease in the maintenance cost per hl. From there onwards the plant has been striving to continually improve and reduce the figure, thus setting a new target of $2.5/HL in F13.

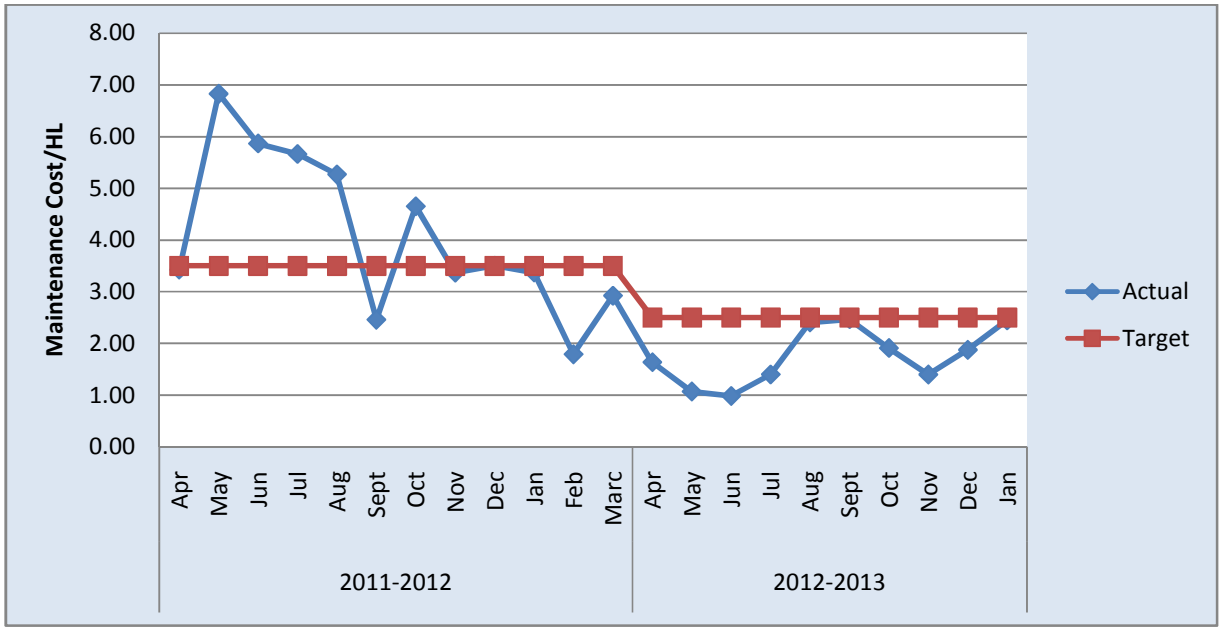

Figure 4.29: Maintenance cost/HL trend from 2011-2013 for Delta Southerton plant

With the entrenchment of good maintenance practices, the F13 target has on numerous occasions been surpassed but the battle is still on since the impact of reducing this figure cannot be overemphasised as far as financial statements is concerned, hence a new target of $1.5/hl will be set in F14. The maintenance costs are given as a ratio per HL so as to have a true picture of the costs relative to the volume of beer produced. Appendix 6 and 7 shows extract summaries of F12 and F13 maintenance costs for Delta Beverages Southerton plant respectively. It also shows the costs per section and the contribution to the TCM.

For the departments to ensure that the good practices are maintained, they have devised some key performance indicators that directly feed into the maintenance costs explained above. By aiming to achieve the targets set per each KPI, the costs are also managed. Table 4.4 shows some of the KPIs trending in the financial year F13.

Table 4.4: Asset Care Key Performance Indicators

		F13 Asset Care KPIs (2012-2013)									
		April	May	June	July	August	September	October	November	December	January
ASSET CARE EFFECTIVENESS											
Back Log	%	8.09	5.15	5.49	3.70	8.17	1.27	7.50	0.00	18.50	9.50
Mean Time To Repair (MTTR) - Hall	Hours	0.35	0.31	0.45	0.37	0.38	0.63	0.75	0.55	0.47	0.62
ASSET CARE EFFICIENCY											
Corrective Schedules (number of)	Number	106.00	57.00	24.00	20.00	19.00	235.00	89.00	22.00	7.00	37.00
Total planned Schedules (number of)	Number	2,243.00	1,187.00	1,587.00	1,411.00	2,391.00	1,989.00	1,754.00	1,742.00	1,197.00	971.00
Corrective work arising from schedules	%	4.73	4.80	1.51	1.42	0.79	11.81	5.07	1.26	0.58	3.81
Schedule Completion Rate	%	80.00	79.66	97.00	97.00	96.80	99.00	88.00	95.00	94.00	90.50
Cancelled PMs	%	19.70	11.54	0.00	19.40	3.70	0.45	7.12	5.00	12.80	0.00
Mean Time Between Repairs (MTBR) - Hall	Hours	7.70	6.60	4.87	3.96	4.92	7.00	6.83	4.42	4.85	4.27
ASSET CARE TACTICAL											
Maintenance Mix (Planned v/s Un-Planned)	%	93.40	95.00	90.40	92.00	92.00	89.90	90.20	93.00	93.80	93.00
ASSET CARE FOCUSSED IMPROVEMENT											
Tags Raised	Number	90.00	84.00	129.00	156.00	200.00	295.00	207.00	414.00	215.00	330.00
Tags Closed	Number	54.00	57.00	97.00	86.00	146.00	174.00	122.00	171.00	133.00	197.00
Tag Closure	Number	0.60	0.68	0.75	0.55	0.73	0.59	0.59	0.41	0.62	0.60
% 5 Why Completion	%	85.00	82.75	70.00	75.00	76.00	80.00	85.00	75.00	78.00	70.00
% FFA Effort	%	65.00	63.30	80.00	60.00	55.00	65.00	75.00	60.00	65.00	78.00
FA Gap closure	%	60.00	60.00	70.00	50.00	50.00	50.00	65.00	50.00	55.00	65.00

The target is to have an increasing trend on all the KPIs with the exception of backlog, cancelled PMs and Mean time to repair. A summary of how these are calculated is shown in Appendix 8 that comprises a set of definitions and calculations. The researcher also noted the integration of these KPIs with the Computerised Maintenance Management System (CMMS) in place. As earlier on highlighted this system is known as COSWIN 7i. This has simplified the maintenance system ever since its launch in October 2011. The Figures shown in the table can be extracted from the system. However, through the interviews, the respondents pointed out that there is a lot of untapped expertise from COSWIN7i since the utilisation is currently estimated at just below 50%. An extract of the COSWIN 7i menu page is shown on Figure 4.30.

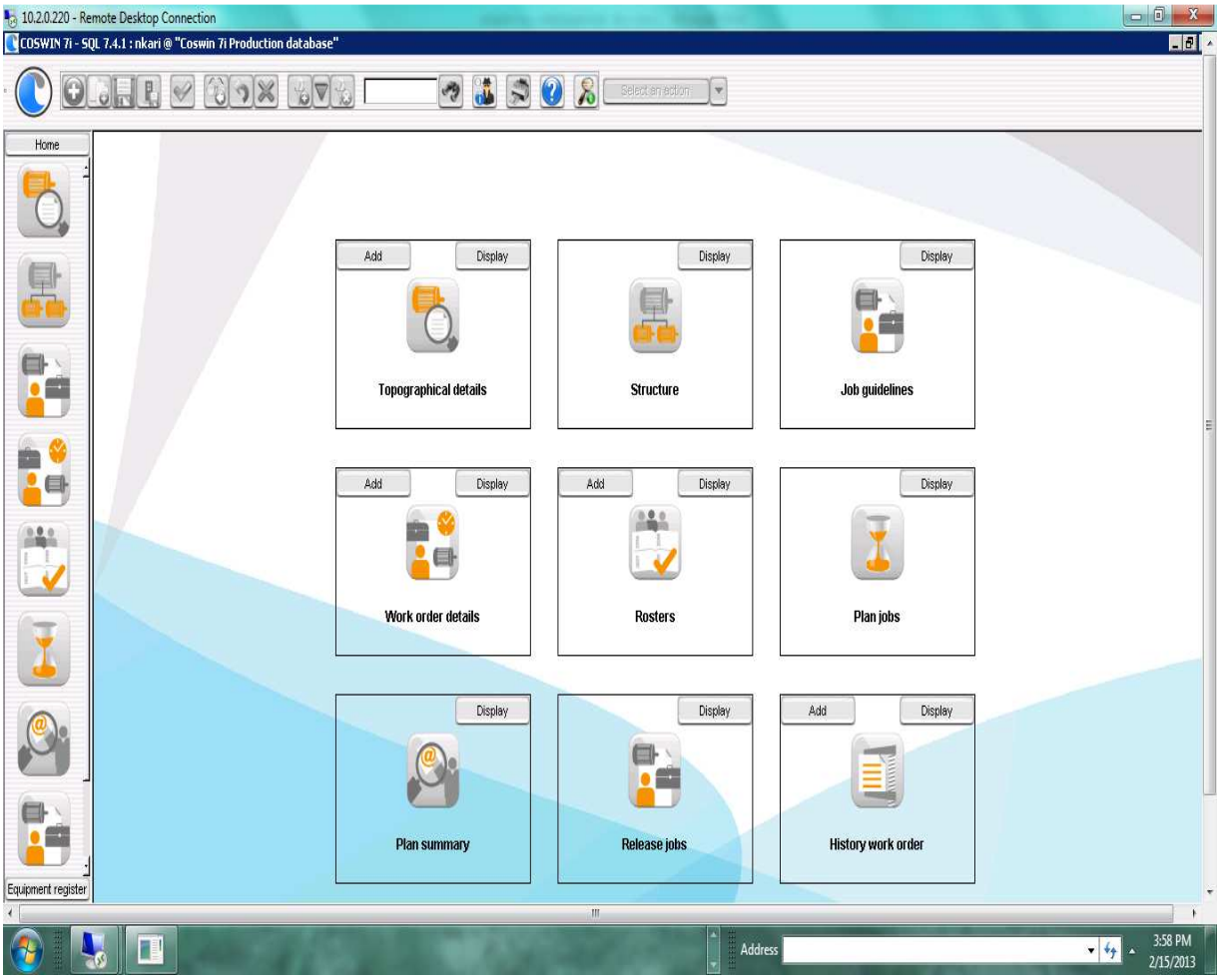

Figure 4.30: COSWIN 7i menu page (CMMS).

This is the hub of all work management cycle that comprises of identifying, planning, scheduling, executing, capturing, analysing and improving the work practises. The working week of all the maintenance teams is centred on this cycle, sometimes abbreviated as IPSECAI. Once this is done right, breakdowns, reworks, overtime and unplanned jobs are minimised thus getting it right on the maintenance cost/hl.

Contracted Work Management

Delta beverages finds itself in several situations whereby it requires the services of external Contractors in order to carry out repairs, projects or installations. From a survey in the most affected areas, that include, Brewing, Utilities, Packaging and Site services, the researcher discovered that there is a very huge opportunity in cost saving. This also tallies with what was presented in the questionnaire response when the respondents felt that contracted charges are overpriced. The middle management have the mandate to represent company interests and negotiate for favourable prices on behalf of the Organisation. The Supervision of major works also should intensify so as to promote best quality work and eliminate reworks. However this does not only apply to external contractors but even the work that is done internally.

4.9 Chapter Summary

This chapter presented a discussion and analysis of the the research findings from questionnaire, survey and interviews which are the main instruments used to gather data in the study. Both primary and secondary data were used to make the decision clear. The findings analysed point to a number of gaps, which if addressed can address the subject of effective cost management for the organisation. A full set of conclusions and recommendations will be discussed in chapter five.

CHAPTER FIVE:

CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter is a presentation of the conclusions that were drawn from questionnaire, survey and interview results. It also dwells on recommendations, which if adopted would allow Delta Beverages Southerton plant to effectively manage its costs throughout the value chain. These recommendations were drawn both from the findings on the case study of Delta Beverages and also from theoretical concepts derived from literature review, as covered in chapter two. Also to be highlighted towards the end of the chapter are areas for further research.

5.1 Conclusions

The study carried at Delta Beverages provided overwhelming evidence that there is great potential to implement effective cost management. This can be achieved through addressing gaps that were identified from the questionnaire responses and also follow up interviews that were conducted. The specific conclusions drawn are summarised as follows;

5.1.1 MANWAY implementation strategy and benefits

The research showed that the implementation of MANWAY as a new way of manufacturing operations has yielded more positive results, noticeable on the shop floor. However there have been identified gaps and opportunities in the way the change process was done as many respondents seemed not to have been satisfied with the way the change has been handled. Whilst the respondents almost unanimously agreed that if implemented, MANWAY will result in effective cost

management, the gap that has to be closed is the level of awareness going as far as the last man on the floor.

5.1.2 Employee awareness on Cost management

Most of the Managers are knowledgeable of the role they play in the value chain as far as cost management is concerned. There was however an observed gap in terms of the real implementation where in some instances costs are not monitored on a daily basis using existing tools such as SYSPRO. This explains why there were mixed feelings in the respondents when they answered on employees awareness on cost management. It has also been concluded through observation that some Supervisory levels do not have a basic training of SYSPRO use hence the issue of real time cost control becomes more imaginable than reality.

5.1.3 Sustainable Development awareness and implementation

The goals on sustainable development and knowledge on the finite nature of resources do exist especially at middle management level. The major challenge that was generally observed was the manner in which electricity or rather energy usage becomes out of control on several occasions. This has become an issue because of the inadequacy in electricity metering which makes it difficult to fully understand the energy usages and implement some control measures. Though water usages are in control in terms of targets set, there was a concern raised by some respondents that the basic conservation procedures do not really exist within employees. This is the point where every employee becomes most crucial. They cited examples such as cases whereby you find water dripping out from taps, lights being on in broad daylight, and air conditioning running with windows open and sometimes they are left to run in unoccupied rooms.

5.1.4 Cost Management as strategic approach

In Chapter two, it was highlighted by George (2012) that the subject of cost management is more strategic than it is operational. This sentiment seems to have been well understood by senior management in the sense that TCM target is set as a strategic goal in which different sections will have to set sectional objectives and action plans on how to achieve them. The organisation currently has a long term plan of targeting a figure of $39/hl and this has seen some sections drafting rigorous actions targeted to influence that which is within their control. Notable deficiencies were observed in the tracking of implementation of such actions. Some departments seem to shelf the action plans until such a time they are reminded of the progress update.

5.1.5 Variable costs and cost management

From the research, it can be concluded that variable costs contribute a greater percentage in terms of manufacturing costs incurred hence their contribution to TCM per HL is on the high side. There was ample evidence that employees feel the pricing on the raw materials are not justified. There was however evidence of some losses being incurred in the plant in terms of breakages and beer losses which if monitored, can help minimise the raw material usages. Product planning is currently running well whereby determination of products start with the sales demand forecasting and market survey, then carrying out a backward feedback until procurement determines the amount of raw materials which is required. These meetings are carried every morning on a daily basis, combining Production, Sales and Distribution departments. Though there will be deviations from plan in some instances, by and large, the plan is followed.

5.1.6 Spares Optimisation

The questionnaire response showed that the trend in breakdowns related to stores have been negligible in the past and reached a point where they are no longer being recorded. This tally with the observation of stock levels which shows that currently engineering stock exceeds $8million which is huge an amount. The probability of getting the required spare in the event of a breakdown becomes close to one especially in the packaging department that contributes 63% of the stockholding. This is the main reason why the Original Equipment Manufacturer is proposing a Spares Availability Concept (SPAC) so as to stop tying money in stock hence the need to reduce the current working capital. Though it has not yet gone full throttle, it has been warmly received by senior managers as a noble idea to manage stock holding especially for the packaging section.

5.1.7 Payroll and overtime costs

There was an overwhelming consensus on the need to minimise overtime costs since it is heavily increasing the overheads for the organisation. Poor planning within sections and also the ineffective utilisation of the 8hr working period has been believed to be the main contributing factors to overtime costs. Though there has been introduced a time and attendance logging system, there were mixed views on the extent to which it is believed to manage overtime costs.

5.1.8 Maintenance costs

The main factors that can contribute to high maintenance costs have been discovered as inadherence to systems especially maintenance procedures and schedules. The best way to get away with this risk is to embrace the MANWAY concept holistically in terms of all the pillars mentioned in chapter four, that include teamwork, 5S, Leading and managing change, Asset Care, Autonomous maintenance, focused improvement, manufacturing flexibility and quality assurance.

5.1.9 Sales and Marketing demand forecasting

The current methods of demand and sales forecasting are not adequate to make a thorough analysis of the trend yet it plays a very important role in the company's operations and future. There is therefore need to have an integrated information management software that can give consumer trends by beer and by location so as to have an efficient route to market system.

5.1.10 Warehousing and distribution transportation system

This stage of outbound logistics can be nightmarish if not planned well and before even noticing, can result in higher costs in managing the transportation system. There lies an opportunity in finding best ways to optimise this stage so as to avoid unnecessary costs.

5.1.11 Discussion of the Hypothesis

As stipulated in Chapter one, the research hypothesis was that with effective cost management practises, it is possible to significantly reduce the TCM and improve on the EBIT. As was adequately tested and proved in the findings in chapter four, the research hypothesis asserts that there is great potential in the subject of reducing TCM. This is made clear especially by looking at the composition of TCM and how it affects the tripple bottom line, then focusing on strategic ways of addressing the subject of cost management across the value chain hence the hypothesis is true.

5.2 Recommendations

The following series of recommendations are presented based on the results of the research, questionnaire and interview responses and the researcher's intuition to the circumstances presented. The recommendations are also in line with the conclusions profiled above.

5.2.1 MANWAY-Implementation of Asset Care and Autonomous Maintenance

Whilst Asset Care practises are entrenched in the practises due to the introduction of MANWAY, there is need for continuous awareness on the shop floor and also periodic refresher courses. This helps in cementing the practices and ensuring sustainability. Autonomous maintenance must also be urgently implemented fully to compliment asset care. This is whereby the operator will do the basic maintenance, cleaning and lubrication of the equipment. This prolongs the life of machines and helps to quickly identify defects. Setting up fully-fledged condition based maintenance will save very critical equipment from premature breakdowns. Major equipment breakdowns cost the organisation a lot of money in terms of lost production and replacement costs hence predictive maintenance eliminates surprises.

5.2.2 Computerised Maintenance Management System

The researcher also discovered that utilisation of the CMMS is not to full capacity hence proposes refresher training especially on the Maintenance Planners who are the main custodians of the system.

5.2.3 Implementation of problem solving actions

The researcher noted that the concept of carrying problem solving sessions for breakdowns has now been cultivated within sections. The problem solving sessions depend on complexity of the problem ranging from 5why's, FFAs to DMAIC. What is now lacking within the sections is the tracking of action plans to ensure closure.

5.2.4 Contracted works adjudication and supervision

There is room for improvement in the awarding of works to contractors, supervision and also opportunity for price negotiations. Quite often, so many jobs will be quoted

as urgent works and this weakens the organisation's negotiating muscle in the event of overcharging. Time to look for three quotations will no longer be available

5.2.5 Sustainable development on Utilities costs.

There is need to install electricity metering in the plant so as to optimise energy usage. The electricity consumption targets have often not been met hence rationalisation can be brought about by metering projects.

5.2.6 Procurement of Materials and Spares.

From the findings, it is recommended that in order to ensure availability of good quality spares in stores, all purchases should be fully specified as per manufacturer's part number and serial numbers. When the spares are delivered, a standard operating procedure for inspection by the technical team should always be in place and adhered to. The issue of approved suppliers list and supplier partnering should be thoroughly revisited. A committee that comprise all facets, that is, procurement, finance and technical team should be in place to carry out a thorough vetting on the prospective suppliers. This ensures that the organisation deals with reputable organisation that supplies best quality products. Supplier partnering increase the bargaining power of Delta Beverages in negotiating prices for the spares and raw materials. Supplier performance should always be periodically reviewed in terms of on time delivery such that those that fail to perform are phased out of the system. It is also prudent for Procurement to purchase in bulk so as to bargain for discounts. There are some raw materials which can be purchased when they are in season and thus prices will be reasonable. This applies to Brewing inputs such as maize and sugar.

5.2.7 Replenishment of Spares.

It is noted with concern that the availability of critical spares is now a major concern. The starting point for this rectification is for sections to thoroughly create what they call critical spares list. It was observed that the previously perceived critical spares list that was in use does not really suffice. As such some instances are now emanating whereby breakdowns occur and there will be no spares in stock. Coupled to that, the stores team should be on the watch to coordinate with the SYSPRO system and address spares issues accordingly, that is, as far as replenishment of stock items is concerned. Quite often the system reflects that some spares will be out of stock but apparently reordering does not take place in time until the time of breakdown.

The quickest way to deal with such a situation is for all parties to make conceited efforts towards the implementation of SPAC. Like mentioned earlier, this gives the current spares status for the three plants in Delta (Graniteside, Southerton and Belmont). The idea will be to look for duplications and try to avoid or minimise. Ideally the end state will be to have a central store for all the breweries in the country and thus minimising tying money in working capital. The spares holding will be guided by what is recommended by the original equipment manufacturer through analysis of failure history and their expertise. A template of the initial analysis that was done is shown in Appendix 9 whereby the spares in the various plants have been checked against what is recommended. In the long term, avenues for returning redundant spares that are in stock and getting credit from the suppliers will have to be explored. There is also urgent need to look for prospective buyers of more than $1m worth of redundant spares, formerly for line 2 and 4 that were decommissioned.

5.2.8 Overtime costs reduction

These costs can be eliminated or minimised through proper planning of tasks well in advance. It is recommended that all overtime works be authorised at senior

management level a day before the works are done. Another tool that will be useful in minimising overtime is by ensuring that the 8hr working period is been effectively utilised. This can be done through introducing an artisan monitoring KPI, known as artisan utilisation so that every minute is accounted for.

5.2.9 Departmental cost control

It is recommended that no spares withdrawals should be done without the signature of the HOS or a representative. It is also advisable to do real time tracking of the costs instead of waiting for month end when budgets would have been already exceeded. To manage the costs well, spares withdrawal requisitions must be preceded with verification of the value of the spares.

5.2.10 Use of IT in Cost Management

With the advent of the digital world, it is recommended to harness IT for better efficiencies. This is done through the use of SYSPRO.

5.2.10.1 Commitment Accounting

The researcher recommends that the IT department implements commitment accounting. This concept allows users to check not only actual costs against budget, but committed costs as well. Committed costs are those where a commitment has been made to purchase a service or items which are not held in stock through the placing of orders, but the service or item has not yet been provided. The current process in SYSPRO is to record a budget per ledger code and then to record the actual value of transaction posted against the ledger code. Thus any costs which are expected are excluded in the check against budget. The principle behind CA is that users are to work strictly within the budgets and a commitment can only be approved if budget exists.

5.2.10.2 Minimum and Maximum stock levels

In SYSPRO one can set up minimum and maximum levels per stock code per warehouse to assist replenishment planning. Using SYSPRO's Warehouse Exception report, one can select to print those items that have fallen below minimum or exceeded maximum. In addition, using SYSPRO's office automation and messaging module, you can configure an event that will inform operators via mechanisms such as email, when the minimum/maximum levels are breached. These emails assist buyers by having up to date information about stock levels.

5.2.11 Distribution, Sales and Marketing

The costs in these departments can be managed in terms of several variables that contribute especially to transportation involved. These variables include volume of goods carried, weight of goods carried, distance over which the goods are carried, number of deliveries and the labour hours.

5.3 Area(s) of further study

Further study into opportunities for cost management in Sales and Marketing is desirable. The researcher did not get enough time to drill into the major cost drivers for that section through follow up interviews as was done in the other sections. Another area for further study would be to arrange for benchmarking with other well performing SABMiller breweries in Africa such as Mbeya in Tanzania and Nile Uganda. The benchmarking visit will be to drill into their operations and understand why their maintenance cost per HL is below $40/hl.

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Appendix 1

A Questionnaire to determine effective cost management techniques for Delta Beverages Lagers Plant.

My name is Norman Karidza and I am a final year student at the Graduate School of Management at the University of Zimbabwe studying for the Master of Business Administration Degree. As part of the programme requirements, i am conducting a research entitled **'Effective cost management in a manufacturing entity: The case of Delta Beverages (2010-2012)'.**

You are one of the few people that have been sampled to give your opinion on the matter.

This is a purely academic research and all information received will be strictly confidential. You will notice that your name will not appear on the questionnaire hence it is also strictly anonymous. Participation is voluntary though the researcher will appreciate a positive response from you.

If you have questions, please do not hesitate to contact the researcher on ext 4142, mobile-0712606934.

Please return completed questionnaires by 08 February 2013, either hand delivered or emailed to n.karidza@delta.co.zw

Yours faithfully

Norman Karidza
Research ID No. R9915522

Appendix 2

QUESTIONNAIRE FOR DELTA BEVERAGES LAGERS PLANT STAFF AND MANAGEMENT

Instructions to respondents

This questionnaire is for Delta Beverages Lagers Plant staff and management. Please mark **(with an x)** against the response of your choice for each question and write additional information in the spaces provided. There are no wrong or right answers.

A. DEMOGRAPHICS

1. What is your current level in the organization?

Management	Supervisory	Staff

2. In which department do you belong?

HR [ ]
IT [ ]
GM's office [ ]
Finance [ ]
Sales and Marketing [ ]
Warehouse & Distribution [ ]
Plant Administration [ ]
Engineering [ ]
Procurement [ ]
Quality Assurance [ ]
Brewing [ ]
Packaging [ ]

3. For how long have you been with Delta Beverages?

< 1 yr	1-<5years	5-<10years	≥10years

4. What is your highest level of education? .

Secondary [ ]
Certificate [ ]
Diploma [ ]
Degree [ ]
Masters [ ]
Other
(Specify)_____

For the questions to follow, may you rank your opinion on a likert scale of 1-5 as guided below

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5

B. IMPACT OF MANWAY (WCM) ON EFFECTIVE COST MANAGEMENT

	1	2	3	4	5
1. A comprehensive and satisfactory change process has been done in order to entrench MANWAY in all departments					
2. Awareness of MANWAY has reached all departments at all levels for Delta lagers plant					
3. If any shop floor employee is randomly selected to explain					

MANWAY, the individual can confidently explain the concept					
4. Ever since the launch of MANWAY concept, there has been visible and tremendous improvements in the processes					
5. MANWAY is a critical component in organizational future growth and fighting against competition					
6. If implemented, MANWAY results in effective cost management for the organisation					

C. SUSTAINABLE DEVELOPMENT ON UTILITIES COSTS

7. Sustainable development is a key concept considered in all operations	1	2	3	4	5
8. Targets for Utilities consumption have been set and are being met					
9. The plant is striving to brew more beer with less water					
10. Electricity metering is adequate to optimize electrical consumption					
11. There is a vibrant recycling drive in the Delta operations					
12. Targets for waste generated exist for all the operations					

D. VARIABLE COSTS REDUCTION

13. Pricing of raw materials is justified and fall within the generally accepted standards	1	2	3	4	5
14. Contracted works for the plant are fairly priced					
15. Rate of spares replacement on equipment is normal					
16. Maintenance procedures being implemented allow for optimal utilization of spares.					

17. A strong negotiating team is set up to query prices charged by suppliers					
18. Product returns, rejects and waste are quantified					
19. All employees are conscietised about the importance of cost management					

E. SPARES OPTIMISATION SYSTEM

	1	2	3	4	5
20. Spares kept in the stores are of high quality					
21. Critical spares storage is adequate					
22. Replenishment of stock in the stores is tightly monitored to maintain adequate stock levels					
23. An effective computer software exists in order to manage stock levels in the organisation					
24. Spares availability concept (SPAC) has been introduced to all sections of the packaging department					
25. SPAC has the potential to optimize spares holding in the stores area					
26. Breakdowns that are related to stores issues are being captured					

F. MANAGING OVERTIME COSTS

	1	2	3	4	5
27. There is great potential to minimize overtime costs at the organisation					
28. Overtime is mainly caused by poor planning within the organisation					

29. If employees effectively utilize the 8hr working period, overtime will be significantly reduced					
30. Access control system helps to significantly reduce costs associated with overtime					

31. List effective cost management practices that you propose in your section

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Appendix 3:

Semi-structured guide to Interview Questions

No.	Question	Target departmen
1	Do you understand the role of your section in the value chain?	All
2	What is your understanding of cost management in your section?	All
3	What are the benefits to Delta beverages of managing costs in your section?	All
4	What are the opportunities of effective cost management in your section?	All
5	Who are the typical users of cost information in your section?	All
6	What are the technologies or software you are using for managing costs within the section?	All
7	Is the team involved in cost management centralized or decentralized?	All
8	How is cost management practiced in your department?	All
9	Is there an inherent top down approach to cost management?	All
10	To what levels do individuals take accountability to cost management?	All
11	Are there adequate cost management controls in place?	All
12	Are there any internal cost awareness training and awareness programs in place?	All
13	Is effective cost management at your plant influenced by any external factors? If so, what are they?	All
14	To what extent has technology influenced effective cost management?	All
15	Within your organization, how do you describe the relationship between cost management and strategy formulation and implementation?	All
16	If you are to describe the perceptions of staff to the issue of cost management, how is it like at the organization?	All
17	When managing costs, are there any sensitive issues that have to be taken into consideration?	All
18	As an individual do you understand the concept of WCM and its impact on cost management	All
19	What are the strategical alternatives you have put in place to manage costs	All
20	What would you consider as the end state for a plant that exhibits WCM	All
21	How are you managing contracted services in terms of outsourcing, pricing and supervision	All
22	What opportunities of effective cost management in your section	All
23	How can logistics costs be improved in the distribution of finished product	Distribution/Wareh
24	How is the trend in the water, electricity and coal consumption against the set targets	Eng
25	What is the split between fixed costs and variable costs? How are each managed?	Finance
26	How do you describe the trend in TCM for the past 2 years	Finance
27	What are some of the internal organizational issues that affect effective cost management?	HR
28	How does the organisation's culture influence cost management?	HR

29	To what extent is overtime overally contributing to TCM for the plant	HR
30	Are they any initiatives you have in place to minimise overtime and if so, are you getting support from sections	HR
31	How effective is the access control system in trying to manage labour utilisation	HR
32	How can information technology form an integral part of the drive to attain effective cost management	IT
33	How are decisions such as process re-engineering, pricing, capacity management etc influenced by the cost management concepts?	Pack/Brew/Eng
34	What maintenance strategies are you implementing and to what extent do they help in cost management	Pack/Brew/Eng
35	How has been the trend in maintenance cost/Hl	Pack/Brew/Eng
36	What are the processes you undertake for a Supplier to be in the approved list	Procurement
37	How do you ascertain the quality of spares you purchase	Procurement
38	Regulations such as Basel II affect to what extent in effective cost management?	Sales & Marketing

Appendix 4:

Summary Stock Levels as at January 2013

RAW MATERIALS					
Malt					535,190.75
Cornstarch					-
Maize grits					229,079.57
Sorghum					-
Sugar					102,041.30
Hops					452,819.53
Crowns					141,269.42
Labels					1,166,231.45
Can Trays					108,635.60
Man.Sundries					824,710.53
Cans & leads					1,988,814.90
Others(glue,inks,shrink wrap etc)					3,047,585.93
Coal					391,049.23
TOTAL RAW MATERIALS					**8,987,428.21**
	-				
PACKAGING					
MACHINE	**UNIT 1**	**UNIT 2 & 4 (decomissioned)**	**LINE 3**	**UNIT 6**	**TOTAL -USD**
FILLER	644,163.70	216,975.30			861,139.00
WASHER	686,365.30	196,121.30	133,376.01		1,015,862.61
EBI	102,099.30	148,851.80		955,350.80	1,206,301.90
PASTEURISER	105,590.10	66,414.08	21,234.07		193,238.25
PACKER & UNPACKER	570,207.80	21,021.01			591,228.81
LABELLER	616,496.40	96,526.74			713,023.14
CONVEYORS	138,287.50	193,718.10			332,005.60
OVERHAUL SPARES		224,462.40			224,462.40
ELECTRICAL GENERAL	59,965.64	6,611.63			66,577.27
TOTAL PACKAGING	**2,923,175.74**	**1,170,702.36**	**154,610.10**	**955,350.80**	**5,203,838.98**
BREWING					**644,585.50**
UTILITIES					**643,978.10**
QUALITY ASSURANCE					**83,731.05**
ELECTRICAL GENERAL					**653,557.56**
GENERAL/OTHER					**1,024,158.18**
TOTAL	**LAGERS**			**QH**	**8,226,487.25**
TOTAL	**SORGHUM**			**QC**	**51,635.44**
OTHER WAREHOUSES					
Stationary - Lagers	**102,372.24**			**SH**	
Protective Clothing	**67,296.53**			**TH**	
Marketing Aids	**28,291.54**			**UH**	
Stationary - Sorghum	**3,925.40**			**SC**	
Consumables	**17,216.63**			**NH**	
KHS SPARES LINE 2&4					
FILLER	216,975.30				
WASHER	187,748.35				
PASTEURISER	35,850.08				
CONVEYORS	86,934.25				
INCAMATIC & DECAMATIC	26,219.37				
TOTAL KHS	**553,727.35**				
GENERAL/ OTHER SPLIT					
PUMPS & KLINGER GASKETS	85,092.64				
BEER HOSES & B/STRIPS	70,880.91				
VEE-BELTS	4,634.00				
BOLTS & LUBRICANTS	111,944.11				
PIPES & FITTINGS	52,361.68				
OIL SEALS,O-RINGS & SENSORS	9,743.00				
BEARINGS	234,305.33				
BALL& GATE VALVES	247,599.81				
PRESSURE GAUGES	6,828.90				
ACTUATORS & MECH SEALS	82,083.42				
WELDING RODS & ACCESSORIES	33,030.02				
AIR SERVICE UNITS & WEARSTRIPS	37,434.67				
MILLING ACCESSORIES	48,219.69				
TOTAL	**1,024,158.18**				

Appendix 5:

Profit and loss summary as at January 2013

	Month							Year to date		
	Actuals	Target	%	Budget	%	Prior Year	%	Actuals	Budget	%
VOLUMES (Hl 000's) - PRODUCTION										
Lager - Malt based	106	109	-2%	109	-2%	107.91	-1%	1 163	1 139	2%
Eagle	6	4	43%	4	43%	4.32	33%	57	55	4%
Traditional beer										
CSD's										
Other Non Alcoholic Beverages										
Non Beverages										
TOTAL PRODUCTION VOLUMES	112	113	-1%	111	1%	112	0%	1 220	1 194	2%
VOLUMES (Hl 000's) - SALES										
Lager - Malt based	53	57	-7%	57	-7%	59.21	-11%	621	621	0%
Eagle	2	2	3%	2	3%	2.19	-8%	18	18	0%
IWBs	1	3	-57%	3	-57%	1.80	-27%		8	-100%
Traditional beer						-				
CSD's	0.76	1	13%	1	13%	0.69	11%	8	8	1%
Maheu										
Schweppes										
Other Non Alcoholic Beverages										
Malt - tonnes										
Plastics - tonnes										
TOTAL SALES VOLUMES	56.81	62.48	-9%	64	-12%	63.88	-11%	647	654	-1%
REVENUE										
Lager - Malt based	9 619 443	10 418 085	-8%	10 418 085	-8%	9,712,178.38	-1%	108 390 533	106 938 776	1%
Eagle	214 826	214 270	0%	214 270	0%	236,874.00	-9%	1 905 771	1 905 216	0%
IWBs	424 582	993 165	-57%	993 165	-57%	600,929.21	-29%		2 818 982	-100%
Traditional beer						7,968.56	-100%			
CSD's	102 630	96 200	7%	96 200	7%	97,181.26	6%	1 087 434	1 081 004	1%
Maheu	929	10 987	-92%	10 987	-92%	13.71	6676%	1 559	11 617	-87%
Schweppes						-				
GRP Lager	12 052 062	12 160 533	-1%	12 160 533	-1%	11,571,432.09	4%	128 229 869	128 338 340	0%
GRP Traditional beer						-				
GRP CSD's						-				
Gross sales income	22 414 472	23 893 240	-6%	23 893 240	-6%	22 226 577	1%	239 615 166	241 093 934	-1%
Discounts	(205 999)	(233 756)	-12%	(233 756)	-12%	(389 367)	-47%	(2 188 490)	(2 216 247)	-1%
Sales Price Discount						-				
Wholesaler Discount	(185 072)	(219 722)	-16%	(219 722)	-16%	(380,702.64)	-51%	(2 037 835)	(2 072 485)	-2%
Cash/COD Discount						-				
Settlement discount given						-				
Ullages	(20 928)	(14 033)	49%	(14 033)	49%	(8,664.13)	142%	(150 656)	(143 761)	5%
NET REVENUE	22 208 473	23 659 484	-6%	23 659 484	-6%	21 837 210	2%	237 426 676	238 877 688	-1%
Excise	(4 590 229)	(5 377 125)	-15%	(5 377 125)	-15%	(4,369,189.87)	5%	(46 435 898)	(47 222 794)	-2%
Sales Tax	(1 288 133)	(1 530 353)	-16%	(1 530 353)	-16%	(1,357,598.16)	-5%	(14 275 109)	(14 517 329)	-2%
NET PRODUCERS REVENUE	16 330 110	16 752 007	-3%	16 752 007	-3%	16 110 422	1%	176 715 669	177 137 565	0%
TOTAL ROYALTIES AND TECHNICAL FEES	(176 993)	(237 021)	-25%	(237 021)	-25%	(203 255)	-13%	(1 971 739)	(2 031 766)	-3%
Royalties Payable - SABMiller						-				
Royalties Payable - Group	(62 204)	(99 639)	-38%	(99 639)	-38%	(100,369.84)	-38%	(732 002)	(769 437)	-5%
Royalties Receivable - Group						-				
Technical Fees Payable - SABMILLER						-				
Technical Fees Payable - Group	(114 788)	(137 382)	-16%	(137 382)	-16%	(102,885.00)	12%	(1 239 737)	(1 262 330)	-2%
Technical Fees Receivable - Group						-				

VARIABLE PRODUCTION COST	(10 063 531)	(10 669 839)	-6%	(10 669 839)	-6%	(10 578 343)	-5%	(112 185 024)	(112 793 560)	-1%
Standard cost of sales - Clear beer	**(4 226 479)**	**(4 070 099)**	**4%**	**(4 070 099)**	**4%**	**(3,967,063.20)**	**7%**	**(47 340 070)**	**(47 185 918)**	**0%**
Standard cost of sales - IWB's						-				
Standard cost of sales - Traditional beer						-				
Standard cost of sales - CSD's						-				
Standard cost of sales - Maheu	**(402)**	**(10 369)**	**-96%**	**(10 369)**	**-96%**	**(7.30)**	**5404%**	**(5 421)**	**(15 389)**	**-65%**
Standard cost of sales - Schweppes						-				
Standard cost of sales - Transfer Lagers	**(5 789 119)**	**(6 548 622)**	**-12%**	**(6 548 622)**	**-12%**	**(6,562,872.37)**	**-12%**	**(64 343 848)**	**(65 103 352)**	**-1%**
Standard cost of sales - Transfer SB'S	**(47 531)**	**(40 749)**	**17%**	**(40 749)**	**17%**	**(44,855.77)**	**6%**	**(495 594)**	**(488 812)**	**1%**
Standard cost of sales - Transfer Sorghum						**(3,518.70)**	**-100%**			
Material usage variance (fav)/unfav						-				
Price variance (fav)/unfav						**(25.30)**	**-100%**	**(90)**	**(90)**	**0%**
By product (income)						-				
VARIABLE DISTRIBUTION COST	(539 459)	(441 512)	22%	(441 512)	22%	(442 992)	22%	(5 126 549)	(5 028 601)	2%
Primary Distribution costs :Group	**(146 839)**	**(136 450)**	**8%**	**(136 450)**	**8%**	**(157,374.72)**	**-7%**	**(2 171 136)**	**(1 523 004)**	**43%**
Primary Distribution costs :Non group	**(222 251)**	**(172 958)**	**28%**	**(172 958)**	**28%**	**(182,080.08)**	**22%**		**(2 191 621)**	**-100%**
Secondary Distribution costs : group	**(132 011)**	**(127 603)**	**3%**	**(127 603)**	**3%**	**(103,537.68)**	**27%**	**(565 580)**	**(1 168 615)**	**-52%**
Secondary Distribution costs : Non group	**(38 359)**					-		**(2 389 833)**		
Distribution variable costs		**(4 500)**	**-100%**	**(4 500)**	**-100%**	-			**(145 361)**	**-100%**
Warehouse variable costs - container losses						-				
VARIABLE COSTS - OTHER	(410 625)	(516 176)	-20%	(516 176)	-20%	(523 748)	-22%	(5 890 545)	(5 993 087)	-2%
Stock Losses	**(107 217)**	**(18 557)**	**478%**	**(18 557)**	**478%**	**19,761.31**	**-643%**	**(801 187)**	**(711 615)**	**13%**
Container losses	**(58 658)**	**(101 361)**	**-42%**	**(101 361)**	**-42%**	**(199,144.69)**	**-71%**	**(1 122 910)**	**(1 165 613)**	**-4%**
Pallet destruction	**(34 048)**					-				
Container/Pallet repairs & MTCE	**39 550**					**(2,390.00)**	**-1755%**	**19 810**	**(157 740)**	**-113%**
Container write down / amortisation	**(190 929)**	**(190 929)**	**0%**	**(190 929)**	**0%**	**(169,450.87)**	**13%**	**(1 909 294)**	**(1 909 294)**	**0%**
Stock revaluation	**13 540**					**9,568.39**	**42%**	**(254 821)**	**(268 360)**	**-5%**
Other	**(72 863)**	**(205 328)**	**-65%**	**(205 328)**	**-65%**	**(182,091.78)**	**-60%**	**(1 822 143)**	**(1 780 465)**	**2%**
GROSS MARGIN	5 139 503	4 887 459	5%	4 887 459	5%	4 362 085	18%	51 541 813	51 290 550	0%
GROSS MARGIN (B/F)	5 139 503	4 887 459	5%	4 887 459	5%	4 362 085	18%	51 541 813	51 290 550	0%
DIRECT MARKETING COSTS	(126 743)	(172 406)	-26%	(172 406)	-26%	(45 599)	178%	(1 504 406)	(1 535 719)	-2%
Above the Line										
Media						-				
Production Costs						-				
Agency Fees						-				
Marketing Brand Sponsorship						-				
Recoveries						-				
Below the Line	(126 743)	**(172 406)**	-26%	(172 406)	-26%	**(45,598.89)**	178%	(1 504 406)	(1 535 719)	-2%
Merchandising/POS						-			**105 484**	**-100%**
Agency Fees						-				
Promotions	**(126 743)**	**(172 406)**	**-26%**	**(172 406)**	**-26%**	**(45,598.89)**	**178%**	**(1 504 406)**	**(1 641 202)**	**-8%**
Recoveries						-				
DIRECT BRAND CONTRIBUTION	5 012 760	4 715 053	6%	4 715 053	6%	4 316 486	16%	50 037 407	49 754 832	1%
Indirect Marketing Costs									**(14 351)**	**-100%**
NET CONTRIBUTION	5 012 760	4 715 053	6%	4 715 053	6%	4 316 486	16%	50 037 407	49 740 481	1%
Corporate brand management						-				
NET MARGIN AFTER CORP BRAND MGT	5 012 760	4 715 053	6%	4 715 053	6%	4 316 486	16%	50 037 407	49 740 481	1%

FIXED COSTS BY FUNCTION	**(2 249 962)**	**(2 426 699)**	**-7%**	**(2 530 020)**	**-11%**	**(2 063 345)**	**9%**	**(23 486 370)**	**(23 763 243)**	**-1%**
Incl Depreciation										
Supply Chain	**(178 040)**			(133 113)	**34%**	**(36,054.97)**	**394%**	**(448 785)**	**(384 202)**	**17%**
Technical & Production	**(1 219 225)**			(1 171 723)	**4%**	**(1,277,776.02)**	**-5%**	**(12 986 702)**	**(12 569 300)**	**3%**
Sales	**(103 754)**			(215 696)	**-52%**	**(88,773.71)**	**17%**	**(966 877)**	**(1 315 687)**	**-27%**
Distribution	**(324 786)**			(371 923)	**-13%**	**(247,887.48)**	**31%**	**(3 084 300)**	**(3 645 675)**	**-15%**
CCD	**(13 917)**					**(18,389.59)**	**-24%**	**(187 063)**		
Channel	**(2 429)**					**(5,033.99)**	**-52%**	**(29 990)**		
Freight	**(51 492)**					**(47,125.13)**	**9%**	**(468 154)**		
Finance	**(226 108)**			(390 503)	**-42%**	**(152,280.91)**	**48%**	**(3 688 247)**	**(4 112 237)**	**-10%**
IS	**(22 759)**			(28 876)	**-21%**	**(14,031.60)**	**62%**	**(185 485)**	**(192 425)**	**-4%**
Executive	**(7 252)**			(28 209)	**-74%**	**(20,723.02)**	**-65%**	**(300 591)**	**(320 830)**	**-6%**
HR	**(100 200)**			(189 978)	**-47%**	**(155,268.65)**	**-35%**	**(1 140 177)**	**(1 222 886)**	**-7%**
MISCELLANEOUS INCOME	(380 370)	(379 620)	0%	(379 620)	0%	(373 375)	2%	(3 634 152)	(3 633 402)	0%
Profit/(loss) on sale of Fixed assets						-				
Miscellaneous product sales						-				
Sundry Income/(Expenses)	**6 745**	**21 649**	**-69%**	21 649	**-69%**	**19,340.79**	**-65%**	**265 578**	**280 483**	**-5%**
Overheads Payable - Group	**(388 615)**	**(402 769)**	**-4%**	(402 769)	**-4%**	**(394,215.77)**	**-1%**	**(3 914 730)**	**(3 928 887)**	**0%**
Overheads Receivable - Group	**1 500**	**1 500**	**0%**	1 500	**0%**	**1,500.00**	**0%**	**15 000**	**15 002**	**0%**
EBITA	2 382 428	1 908 734	25%	1 805 413	32%	1 879 766	27%	22 916 885	22 343 836	3%
Amortisation										
EBIT	2 382 428	1 908 734	25%	1 805 413	32%	1 879 766	27%	22 916 885	22 343 836	3%

Ratios	Actuals		%	Budget	%		%	Actuals	Budget	%
Gross Margin %	31%	29%		29%		27%		29%	29%	
Operating income to net sales %	15%	11%		11%		12%		13%	13%	
Non Grp Overheads to net sales %	-15%	-16%		-16%		-13%		-14%	-14%	
Total overheads to net Sales %	-17%	-18%		-19%		-16%		-16%	-16%	
NPR per hectolitre	96.71	95.46		95.38		91.48		94.70	95.85	
Non Grp Cost of sales per Hectolitre	(59.60)	(60.80)	-2%	(60.75)	-2%	(60.07)	-1%	(60.12)	(61.04)	-2%
Total Cost Of Sales per hectolitre	(65.23)	(66.26)	-2%	(66.20)	-1%	(65.56)	-1%	(66.02)	(67.00)	-1%
Gross Margin per hectolitre	45.87	43.25	6%	43.86	5%	38.87	18%	42.26	42.96	-2%
Marketing Per Hectolitre	(0.75)	(0.98)	-24%	(0.98)	-24%	(0.26)	190%	(0.81)	(0.83)	-3%
Non Grp Overheads per hectolitre	(13.33)	(13.83)	-4%	(14.41)	-7%	(11.72)	14%	(12.59)	(12.86)	-2%
$ Payroll	(843,918)	(785,007)	8%	(785,007)	8%	(8,477,349)	-90%	(8,477,349)	(3,435,719)	147%
Payroll Per Hectolitre	(5.00)	(4.47)	12%	(4.47)	12%	(48.14)	-90%	(4.54)	(1.86)	144%
Maintenance Overhead $	(535,837)	(608,495)	-12%	(608,495)	-12%	(5,889,127)	-91%	(5,889,127)	(3,096,934)	90%
Maintenance Per hectolitre	(3.17)	(3.47)	-8%	(3.46)	-8%	(33.44)	-91%	(3.16)	(1.68)	88%
Other Non Grp Overheads	(463,027)	(617,855)	-25%	(617,855)	-25%	(4,564,329)	-90%	(4,564,329)	(2,324,986)	96%
Other Non Grp Overheads per Hectolitre	(2.74)	(3.52)	-22%	(3.52)	-22%	(25.92)	-89%	(2.45)	(1.26)	94%
Non Grp Overheads Excl Depri per hectolitre	(10.91)	(11.46)	-5%	(11.45)	-5%	(107.50)	-90%	(10.14)	(4.79)	112%
Total Overheads per hectolitre	(16.37)	(17.10)	-4%	(17.67)	-7%	(14.21)	15%	(15.48)	(15.81)	-2%
Operating income per hectolitre	14.11	10.88	30%	10.28	37%	10.67	32%	12.28	12.09	2%

Appendix 6:

F12 Maintenance costs summary for Delta Southerton Plant

		F12 Summary (2011-2012)											
		April	May	June	July	August	September	October	November	December	January	February	March
TOTAL MAINTENANCE COST	**US$**												
Total Maintenance Costs	US$	380,177.19	641,509.56	632,138.81	553,427.19	571,108.00	325,058.00	548,321.00	439,284.19	439,284.00	403,536.25	188,854.94	265,476.19
Total Parts and Materials (P&M)	US$	380,177.19	641,509.56	632,138.81	553,427.19	571,108.00	325,058.00	548,321.00	439,284.19	439,284.00	281,649.13	144,584.42	91,319.83
Total Services and Contracts (S&C)	US$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	121,887.13	44,270.52	174,156.38
BREWING MAINTENANCE COST	**US$**												
Brewing Maintenance Cost	US$	148,304.44	146,786.70	217,116.80	188,853.30	166,917.00	118,914.00	213,387.00	178,606.50	78,444.00	128,058.30	36,826.48	40,746.12
Brewing Parts and Materials (P&M)	US$	148,304.44	146,786.70	217,116.80	188,853.30	166,917.00	118,914.00	213,387.00	178,606.50	78,444.00	128,058.30	36,826.48	40,746.12
PACKAGING MAINTENANCE COST	**US$**												
Packaging Maintenance Cost	US$	127,717.50	410,821.19	288,302.09	170,558.09	99,573.00	116,710.00	114,709.00	94,881.39	109,969.00	126,595.25	87,285.91	91,926.39
Packaging Parts and Materials (P&M)	US$	127,717.50	410,821.19	288,302.09	170,558.09	99,573.00	116,710.00	114,709.00	94,881.39	109,969.00	111,093.60	87,285.91	30,681.42
UTILITIES MAINTENANCE COST	**US$**												
Utilities Maintenance Cost	US$	104,155.26	83,901.67	126,719.90	194,015.80	304,618.00	89,434.00	220,225.00	165,796.30	250,871.00	116,489.70	64,742.55	132,803.69
Utilities Parts and Materials (P&M)	US$	104,155.26	83,901.67	126,719.90	194,015.80	304,618.00	89,434.00	220,225.00	165,796.30	250,871.00	42,497.23	20,472.03	19,892.29
Total cost of maintenance	**US$/hl**	**3.43**	**6.83**	**5.87**	**5.66**	**5.27**	**2.46**	**4.65**	**3.37**	**3.50**	**3.37**	**1.79**	**2.92**
Parts and Materials (P&M)	US$/hl	3.43	6.83	5.87	5.66	5.27	2.46	4.65	3.37	3.50	2.35	1.37	1.01
Services and Contracts (S&C)	US$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.02	0.42	1.92
BREWING COST OF MAINTENANCE	**US$/hl**												
Brewing cost of maintenance	US$/hl	1.34	1.56	2.02	1.93	1.54	0.90	1.81	1.37	0.63	1.07	0.35	0.45
Parts and Materials (P&M)	US$/hl	1.34	1.56	2.02	1.93	1.54	0.90	1.81	1.37	0.63	1.07	0.35	0.45
Services and Contracts (S&C)	US$/hl	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PACKAGING COST OF MAINTENANCE	**US$/hl**												
Packaging cost of maintenance	US$/hl	1.15	4.37	2.68	1.75	0.92	0.88	0.97	0.73	0.88	1.06	0.83	1.01
Parts and Materials (P&M)	US$/hl	1.15	4.37	2.68	1.75	0.92	0.88	0.97	0.73	0.88	0.93	0.83	0.34
Services and Contracts (S&C)	US$/hl	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.67
UTILITIES COST OF MAINTENANCE	**US$/hl**												
Utilities cost of maintenance	US$/hl	0.94	0.89	1.18	1.99	2.81	0.68	1.87	1.27	2.00	0.97	0.61	1.46
Parts and Materials (P&M)	US$/hl	0.94	0.89	1.18	1.99	2.81	0.68	1.87	1.27	2.00	0.35	0.19	0.22
Services and Contracts (S&C)	US$/hl	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.42	1.24
Total Maintenance Costs - SLA Equipment	US$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65,099.69	0.00	30,680.87
Non-consumable spares (Spare Parts)	US$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8,249.84	0.00	7,956.02
Spares due to wear and tear (overhaul parts)	US$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	56,849.85	0.00	22,724.85
MAINTENANCE COST BENCHMARKING	**US$**												
Total Cost of Maintenance (COM) % of TCM	%	0.07	0.12	0.13	0.12	0.11	0.06	0.10	0.08	0.08	0.07	0.04	0.06
Brewing Cost of Maintenance (COM) % of TCM	%	0.03	0.03	0.04	0.04	0.03	0.02	0.04	0.03	0.01	0.02	0.01	0.01
Packaging Cost of Maintenance (COM) % of TCM	%	0.02	0.08	0.06	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Utilities Cost of Maintenance (COM) % of TCM	%	0.02	0.02	0.03	0.04	0.06	0.02	0.04	0.03	0.05	0.02	0.01	0.03
Maintenance Investment Ratio (MIR)	%	0.07	0.12	0.13	0.12	0.11	0.06	0.10	0.08	0.08	0.07	0.04	0.06
OME Overall Maintenance Efficiency	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	231.70	6.92	1.33	1.17	2.00

Appendix 7:

F13 Maintenance costs summary for Delta Southerton Plant

		F13 Summary (2012-2013)									
MAINTENANCE COSTS		April	May	June	July	August	September	October	November	December	January
TOTAL MAINTENANCE COST	**US$**										
Total Maintenance Costs	US$	201,380.09	114,062.54	116,392.98	150,447.69	291,145.34	330,213.28	295,690.31	203,378.09	284,448.09	302,196.38
Total Parts and Materials (P&M)	US$	126,425.52	55,378.25	74,836.02	136,141.59	226,642.16	222,763.31	229,624.95	154,249.38	246,333.08	218,710.88
Total Services and Contracts (S&C)	US$	74,954.58	58,684.29	41,556.97	14,306.10	64,503.18	107,449.98	66,065.34	49,128.72	38,115.02	83,485.52
BREWING MAINTENANCE COST	**US$**										
Brewing Maintenance Cost	US$	79,137.00	29,281.00	46,668.97	58,416.56	113,658.69	132,457.00	65,213.00	85,304.00	76,679.00	165,711.39
Brewing Parts and Materials (P&M)	US$	18,652.00	20,229.00	36,313.97	58,416.56	107,899.90	93,472.07	53,195.77	58,635.43	58,853.28	151,904.20
Brewing Services and Contracts (S&C)	US$	60,485.00	9,052.00	10,355.00		5,758.79	38,984.93	12,017.23	26,668.57	17,825.72	13,807.19
PACKAGING MAINTENANCE COST	**US$**										
Packaging Maintenance Cost	US$	74,480.00	21,537.79	24,066.02	58,038.12	58,412.86	90,579.00	61,391.89	50,212.50	49,669.00	54,639.00
Packaging Parts and Materials (P&M)	US$	74,480.00	21,537.79	24,042.67	58,038.12	58,412.86	90,579.00	58,791.89	48,041.65	49,669.00	47,707.00
Packaging Services and Contracts (S&C)	US$		0.00	23.35				2,600.00	2,170.85		6,932.00
UTILITIES MAINTENANCE COST	**US$**										
Utilities Maintenance Cost	US$	47,763.09	63,243.75	45,658.00	33,993.01	119,073.79	107,177.30	169,085.41	67,861.60	158,100.09	81,846.00
Utilities Parts and Materials (P&M)	US$	33,293.51	13,611.46	14,479.38	19,686.91	60,329.40	38,712.25	117,637.30	47,572.30	137,810.80	19,099.67
Utilities Services and Contracts (S&C)	US$	14,469.58	49,632.29	31,178.62	14,306.10	58,744.39	68,465.05	51,448.11	20,289.30	20,289.30	62,746.33
TOTAL COST OF MAINTENANCE	**US$/hl**										
Total cost of maintenance	**US$/hl**	**1.64**	**1.07**	**0.98**	**1.40**	**2.41**	**2.47**	**1.91**	**1.40**	**1.87**	**2.45**
Parts and Materials (P&M)	US$/hl	1.03	0.52	0.63	1.27	1.87	1.67	1.48	1.06	1.62	1.77
Services and Contracts (S&C)	US$	0.61	0.55	0.35	0.13	0.53	0.80	0.43	0.34	0.25	0.68
BREWING COST OF MAINTENANCE	**US$/hl**										
Brewing cost of maintenance	US$/hl	0.64	0.27	0.39	0.54	0.94	0.99	0.42	0.59	0.51	1.34
Parts and Materials (P&M)	US$/hl	0.15	0.19	0.31	0.54	0.89	0.70	0.34	0.40	0.39	1.23
Services and Contracts (S&C)	US$/hl	0.49	0.08	0.09	0.00	0.05	0.29	0.08	0.18	0.12	0.11
PACKAGING COST OF MAINTENANCE	**US$/hl**										
Packaging cost of maintenance	US$/hl	0.61	0.20	0.20	0.54	0.48	0.68	0.40	0.35	0.33	0.44
Parts and Materials (P&M)	US$/hl	0.61	0.20	0.20	0.54	0.48	0.68	0.38	0.33	0.33	0.39
Services and Contracts (S&C)	US$/hl	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.06
UTILITIES COST OF MAINTENANCE	**US$/hl**										
Utilities cost of maintenance	US$/hl	0.39	0.59	0.39	0.32	0.98	0.80	1.09	0.47	1.04	0.66
Parts and Materials (P&M)	US$/hl	0.27	0.13	0.12	0.18	0.50	0.29	0.76	0.33	0.91	0.15
Services and Contracts (S&C)	US$/hl	0.12	0.47	0.26	0.13	0.49	0.51	0.33	0.14	0.13	0.51
KRONES SLA EQUIPMENT MAINTENANCE COSTS	US$										
TOTAL MAINTENANCE COST - SLA Equipment	**US$**										
Total Maintenance Costs - SLA Equipment	US$	74,387.45	21,537.79	19,585.57	58,038.12	58,412.86	80,433.84	42,009.40	0.00	38,534.50	42,100.91
Non-consumable spares (Spare Parts)	US$	27,891.13	7,246.64	6,461.83	3,225.73	41,540.66	48,626.55	14,816.10	0.00	14,674.16	16,347.35
Spares due to wear and tear (overhaul parts)	US$	46,496.32	14,291.15	13,123.74	54,812.39	16,872.20	31,807.29	27,193.30	0.00	23,860.34	25,753.56
PACKAGING MAINTENANCE COST - SLA	**US$**										
Packaging Maintenance Costs - SLA Equipment	US$	74,387.45	21,537.79	19,585.57	58,038.12	58,412.86	80,433.84	42,009.40	0.00	38,534.50	42,100.91
Non-consumable spares (Spare Parts)	US$	27,891.13	7,246.64	6,461.83	3,225.73	41,540.66	48,626.55	14,816.10		14,674.16	16,347.35
Spares due to wear and tear (overhaul parts)	US$	46,496.32	14,291.15	13,123.74	54,812.39	16,872.20	31,807.29	27,193.30		23,860.34	25,753.56
MAINTENANCE COST BENCHMARKING	**US$**										
Total Cost of Maintenance (COM) % of TCM	%	0.04	0.02	0.02	0.03	0.06	0.06	0.05	0.04	0.05	0.06
Brewing Cost of Maintenance (COM) % of TCM	%	0.02	0.01	0.01	0.01	0.02	0.03	0.01	0.01	0.01	0.03
Packaging Cost of Maintenance (COM) % of TCM	%	0.01	0.00	0.00	0.01	0.01	0.02	0.01	0.01	0.01	0.01
Utilities Cost of Maintenance (COM) % of TCM	%	0.01	0.01	0.01	0.01	0.03	0.02	0.03	0.01	0.03	0.02
Maintenance Investment Ratio (MIR)	%	0.04	0.02	0.02	0.03	0.06	0.06	0.05	0.04	0.05	0.06
OME Overall Maintenance Efficiency	%	12.19	12.63	4.15	4.09	2.19	26.55	13.40	3.47	1.66	10.56

Appendix 8:

Asset Care KPIs definitions and formulae

5-Why Completion

- It is a measure to track first tier / level problem solving activities. Majority of 5-Why's will be initiated on shift and the goal would be to complete the 5-Why on the same shift. A completed 5-Why is one whereby the team has identified a root cause to the problem and closed / signed off the document.

$$\%\ 5\text{-Why Completion} = \frac{\text{Number of 5-Why's completed in period}}{\text{Total Number of 5-Why's in period}}$$

FFA – Formal Failure Analysis Effort

- It is a measure to track second tier / level problem solving activities. Majority of FFA's will be initiated on shift against pre-defined triggers and the goal would be to complete the FFA as soon as possible. FFA effort should increase over time.

$$\%\ \text{FFA Effort} = \frac{\text{Number of FFA's completed in period}}{\text{Total Number Breakdowns in period}}$$

Cancelled Planned Maintenance (PM)

- It is critical to monitor the planned maintenance work not performed and to be aware of any associated risks. It measures the effectiveness of the planning process inclusive of resources (People & Spares) to execute the planned tasks PM. Highlights the role of the planner to plan for & manage their plan vs. execution to plan. Authorisation levels for cancelling of planned work should be established requiring as a minimum the section engineer's authorisation.

$$\%\ \text{cancelled PM's} = \frac{\text{Number of cancelled or closed with "Zero or fraction" of time}}{\text{Total number of Planned PM's}}$$

PM Schedule Compliance rate

- Measure of the effectiveness of executing planned PM inspection tasks identified through either RCM, OSHA, HAZOP, process safety management, Quality etc. requirements that need to be performed. The role of the planner to manage their workload in the CMMS effectively

$$\text{PM Schedule Compliance} = \frac{\text{Number of PM completed or closed in CMMS}}{\text{Number of planned PM's}}$$

Maintenance Mix

- The maintenance mix illustrates the total maintenance effort as a ratio of how much is breakdown based, proactive or planned, corrective maintenance and predictive, using predictive technology tools. The maintenance mix is a ratio of WO types that should fall within a KPI range. When outside of the KPI range, action is required.

Planned Maintenance (PM) Backlog

- It is a measure of PM work order management & control in the CMMS. A high backlog increases the risk of the probability of a failure likely to occur. Planned work hours that are not complete and greater than 7 days old.

Appendix 9

Spares Availability Concept (SPAC) for Delta Beverages

Delta Beverages - Harare - C357289 - C354282 - 356269 - Bulawayo - C355388																	
Part Number	Installed quantity	Unit	part description E	Cross reference Line	Cross reference Line	Cross reference Line	Cross reference Line	IN STOCK BELMONT - C355388	IN STOCK GRANITESIDE - C356269	IN STOCK SOUTHERTON-C354282	IN STOCK SOUTHERTON-C357289	TOTAL	VARIANCE (REQUIRED)	Spare part indicator (R = Contingency; V = Wear part)	Failure characteristic (UP = unpredictable; PR = predictable)
0023119046	4.000	ST	GASKET G15 DIN 11851	C354282	C355388	C356269	C357289	0	0	1	1	2	2.00	V	PR
0023119086	57.000	ST	GASKET G25 DIN 11851	C354282	C355388	C356269	C357289	0	0	2	5	7	50.00	V	PR
0023119126	36.000	ST	GASKET (REPT.0023119127)	C354282	C355388	C356269	C357289	0	0	2	0	2	34.00	V	PR
0023119146	2.000	ST	GASKET G50 DIN 11851	C355388	C356269			0	0	0	0	0	2.00	V	PR
0023119166	22.000	ST	GASKET G65 DIN 11851	C354282	C355388	C356269		0	0	1	0	1	21.00	V	PR
0023119186	6.000	ST	GASKET G80 DIN 11851	C354282	C355388	C357289		0	0	0	0	0	6.00	V	PR
0023119226	2.000	ST	GASKET G100 DIN 11851	C356269				0	0	0	0	0	2.00	V	PR
0023300312	15.000	ST	CYLINDER EG-H LO/FS	C354282	C355388			0	0	0	0	0	15.00	R	PR
0023383591	16.000	ST	BUSH FLAP NW 65	C354282	C355388			0	0	0	0	0	16.00	R	PR
0023383592	8.000	ST	DISK VALVE 30145001 NW 65	C354282	C355388			0	0	0	0	0	8.00	R	PR
0023383599	8.000	ST	GASKET EPDM NW 65	C354282	C355388			0	0	1	0	1	7.00	V	PR
0023383947	18.000	SA	GASKET SET FOR ZFA NW 65	C354282	C355388			0	0	1	0	1	17.00	V	PR
0023700023	6.000	ST	GASKET SET 58-34-210/01 DN 25 EPDM	C354282	C355388	C356269	C357289	0	0	1	1	2	4.00	V	PR
0023700037	1.000	ST	GASKET SET RUF2+RUF3-40 H78167	C356269				0	0	0	0	0	1.00	V	PR
0023700039	2.000	ST	GASKET SET DN 65 EPDM H78174	C356269				0	0	0	0	0	2.00	V	PR
0023700040	4.000	ST	GASKET KIT 58-34-215/01 DN 80 EPDM	C354282	C355388	C357289		0	0	1	1	2	2.00	V	PR
0023700051	6.000	ST	PRESSURE SPRING RUF3-25 H14625	C354282	C355388	C356269	C357289	0	0	1	0	1	5.00	V	PR
0023700078	4.000	ST	GASKET 5832177/93 DN 15	C356269				0	0	0	0	0	4.00	V	PR
0023700081	2.000	ST	GASKET 58-32-127/93 DN 10	C356269				0	0	0	0	0	2.00	V	PR
0023700607	174.000	ST	GASKET FGN1 58-32-277/93 DN 25	C354282	C355388	C356269	C357289	0	0	3	5	8	166.00	V	PR
0023700617	114.000	ST	GASKET FGN1 58-32-377/93 DN 40	C354282	C355388	C356269	C357289	2	0	3	5	10	104.00	V	PR
0023700627	17.000	ST	GASKET FGN1 58-32-427/93 DN 50 H77	C355388	C356269			0	0	0	0	0	17.00	V	PR
0023700637	131.000	ST	GASKET FGN1 58-32-477/93 DN 65	C354282	C355388	C356269	C357289	0	0	2	0	2	129.00	V	PR
0023700647	97.000	ST	GASKET FGN1 58-32-527/93 DN 80 H77	C354282	C355388	C356269	C357289	0	0	2	2	4	93.00	V	PR
0023700657	12.000	ST	GASKET FGN1 58-32-627/93 DN100	C354282	C355388	C356269	C357289	0	0	1	0	1	11.00	V	PR
0023700667	1.000	ST	GASKET FGN1 58-32-677/93 DN125	C356269				0	0	0	0	0	1.00	V	PR
0023700677	4.000	ST	GASKET FGN1 58-32-727/93 DN150	C355388	C356269			0	0	0	0	0	4.00	V	PR
0023800006	3.000	ST	DIRT TRAP A4 NW 80	C354282	C355388	C357289		0	0	0	0	0	3.00	R	PR
0023800054	3.000	ST	FILTER ELEMENT 0.25MM 1.4301 NW 80	C354282	C355388	C357289		0	0	0	0	0	3.00	V	PR
0023800058	3.000	ST	FILTER ELEMENT 0.10MM 1.4301 NW 80	C354282	C355388	C357289		0	0	0	0	0	3.00	V	PR
0026000052	13.000	ST	OILER G 1/4 0821301404	C354282	C355388			0	0	0	0	0	13.00	R	PR
0026000148	1.000	ST	CYLINDER	C356269				0	0	0	0	0	1.00	R	PR
0026000223	4.000	ST	CYLINDER R82202017	C354282	C355388	C356269	C357289	0	0	9	0	9	(5.00)	R	UP
0026000246	4.000	ST	CYLINDER 0822242003	C354282	C355388			0	0	0	0	0	4.00	R	PR
0026000357	2.000	ST	SWIVEL CLAMP 1827001500	C357289				0	0	0	0	0	2.00	R	PR
0026000383	3.000	ST	VALVE	C355388	C356269	C357289		0	0	0	0	0	3.00	R	UP
0026000404	4.000	ST	SWIVEL CLAMP 1827002046	C354282	C355388			0	0	0	0	0	4.00	R	PR
0026000454	92.000	ST	SCREW THROTTLE 0821200198	C354282	C355388	C356269	C357289	0	6	2	3	11	81.00	R	PR
0026000459	3.000	ST	VALVE R821302964	C354282	C355388	C357289		0	0	0	0	0	3.00	R	UP
0026000534	8.000	ST	GASKET	C354282	C355388	C356269	C357289	0	0	0	0	0	8.00	V	PR
0026000662	4.000	ST	WEAR PARTS KIT R127009116	C354282	C355388	C356269	C357289	0	0	1	1	2	2.00	V	PR
0026000706	64.000	ST	VALVE	C354282	C355388	C356269	C357289	0	0	100	0	100	(36.00)	R	PR
0026000859	4.000	ST	SILENCER G 3/8 R827999928	C357289				0	0	0	0	0	4.00	R	PR
0026004090	12.000	ST	VALVE 3/2 24V 0820018128	C354282	C355388	C356269	C357289	0	0	0	1	1	11.00	R	UP
0026004800	3.000	ST	VALVE	C355388	C356269	C357289		0	0	0	0	0	3.00	R	UP
0026004880	4.000	ST	VALVE 0820204003	C354282	C355388			0	0	0	0	0	4.00	R	UP
0026004930	17.000	ST	VALVE 7472D03267	C354282	C355388	C356269	C357289	0	0	28	0	28	(11.00)	R	UP
0026006660	4.000	ST	VALVE 0820401005	C354282	C355388			0	0	0	0	0	4.00	R	PR
0026006890	18.000	ST	SCREW THROTTLE 0821201104	C354282	C355388	C356269	C357289	0	0	0	0	0	18.00	R	PR
0026008010	4.000	ST	VALVE 0821000003	C354282	C355388	C356269	C357289	0	0	0	0	0	4.00	R	UP