

**BINDURA UNIVERSITY OF SCIENCE EDUCATION  
FACULTY OF COMMERCE  
DEPARTMENT OF ECONOMICS**



**THE IMPACT OF TOTAL QUALITY MANAGEMENT (TQM) ON  
ORGANISATIONAL PROFITABILITY. A CASE OF DAIRIBORD  
ZIMBABWE LTD.**

**SUBMITTED BY**

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## APPROVAL FORM

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## DECLARATION

I Runyararo Dowa declare that this research project herein is my original work and has not been copied or extracted from previous source without acknowledgement of the source.

...../...../...../.....

Signature

date

## **DEDICATIONS**

This research is dedicated to my mom for her tireless support and contribution to my academic life.

## **ABSTRACT**

The study seeks to determine the impact of total quality management on organisational profitability, case of Dairibord Zimbabwe Ltd. Theory says, if well implemented and handled, total quality management can be one of the important factors for an organisation to improve its performance such as profitability. The study used secondary data obtained from Dairibord Zimbabwe Ltd (DZL). In pursuit to meet the objectives the study used the Ordinary Least Squares (OLS) estimation method. The dependent variable was profitability and the independent variables were quantity and price of own good, quality of the product, and a dummy variable measuring total quality management (TQM). The results of the estimation model show that there is a positive relationship between quality, quantity and profitability. A negative relationship was found between price of own product and profitability. Thus, the researcher recommends that Dairibord Zimbabwe Ltd (DZL) Dairibord should maintain the TQM system and possibly improve on other areas of the system that they were not fully implementing to realise better returns in terms of profitability. In addition other companies within the dairy sector that have not yet adopted TQM should adopt it as it yields better performance in as far as profitability is concerned.

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## **CHAPTER I**

### **INTRODUCTION**

#### **1.1 INTRODUCTION**

Total quality management (TQM) theory has become more familiar in the manufacturing industry in recent times across the international divide (Ngambi, 2017). Due to more intense competition and rapid developments in the business environment such as globalization, innovative methods of operation such as TQM have become the norm in most manufacturing industries in an effort to fend off stiff competition and meet the ever changing customer needs and expectations (Dean and Bowen, 1994). Most firms these days are structured in such a way that they provide quality products or services throughout their supply chain (Oakland, 1995). The practice demands quality in all dimensions of the company's undertakings with things done as desired from the onset and any wastage and spoilages being kept to the very minimum during routine business (Stock and Mulki, 2009). In order to compete effectively, it has become essential for businesses to constantly improve on the quality of their products and services by marketing, product differentiation and cost reduction to satisfy their customers (Chang and Huang, 2005).

There are mixed results about the relationship between Total Quality Management and organisational performance (Dale et al, 1994, Lockwood et al, 1996). The use of Total Quality Management in organisations can bring an immediate response to profitability through improved service quality.

#### **1.2 BACKGROUND OF THE STUDY**

The pioneers and most influential figures of the quality improvement during the second half of the twentieth century such as Deming (1986; 1993), Juran (1964) and Crosby

(1979), supported the idea that there is a wholesome connection between adopting total quality management and organisational profitability (Pignanelli & Caillag, 2018). The roots of Total Quality Management can be traced to early 1920's production quality control ideas, and notably the concepts developed in Japan beginning in the late 1940's and 1950's, pioneered by the Americans Feigenbum (1951), Juran (1964), Deming (1986; 1993) among others. Total quality management in the procurement fulfils some of the 5 Rs in purchasing which are right quality, right price and right time. By obtaining value for money quality is obtained in every purchase (Monczka Monck, 2005).

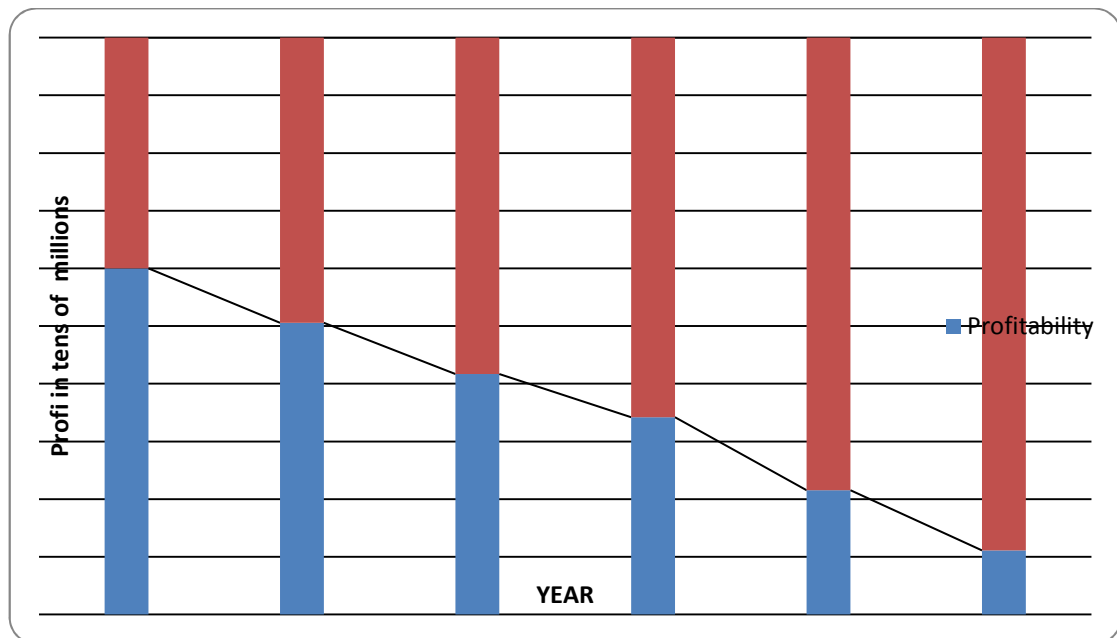
Companies in the manufacturing sector in Zimbabwe are in a move to improve their profitability and performance and Dairibord is one among them. In Zimbabwe most of the companies have implemented Total Quality Management and are being ISO Certified (Zimbabwe Independent, 2018). Among those which are certified are big companies like Delta Beverages, Fawcett, just to mention a few. The implementation of TQM has been done as a way of improving the profitability of the organisation as a whole. According to Lysons et al (2010), quality of services offered can be improved through implementing Total Quality Management and ensuring that the policy is understood by all. Profitability can be improved through achievement in certain aspects for example improving quality hence will lead to more sales and also reducing costs by all means.

Due to different changes in the day to day running of the business, Dairibord Holdings has adopted different quality management standards such as ISO 9001:2000, ISO 22000:2005 and quality management systems like Purchasing Quality Determination (PQD), Total Quality Management (TQM), among others to achieve quality excellence. On the other hand, the emphasis on TQM as a new way of managing companies to improve competitiveness and profitability has increased considerably over the past few years. Different studies showed the positive impact of total quality implementation on organizational profitability.

Back in the years around 1952, the Dairy Marketing Board was operating. Years passed and it was commercialized under the Economic Structural Adjustment Program (ESAP) after years of loss making operations. In 1994 DMB's legal status changed from a parastatal to Dairibord Zimbabwe Limited (DZL) under the Companies Act owned by

Government 100%. In 1997, the process of privatization completed and Dairibord became the first state owned company in Zimbabwe to be privatised with Government divesting out 75% to private investors. Dairibord was listed on the Zimbabwe Stock Exchange on 15 September 1997. Thus, Dairibord began its existence as a debt-free, enterprise with positive cash flow but however not so satisfactory. That was from 1997 to date, were it is operating in a much more favourable way. The graph below shows how it was operating over the years. Previously, the volume and price of all milk sales were controlled by the Government through DMB. Dairibord is presently one of the largest manufacturing and marketing companies in Zimbabwe.

**Fig 1.1: Dairibord Profits before TQM implementation**



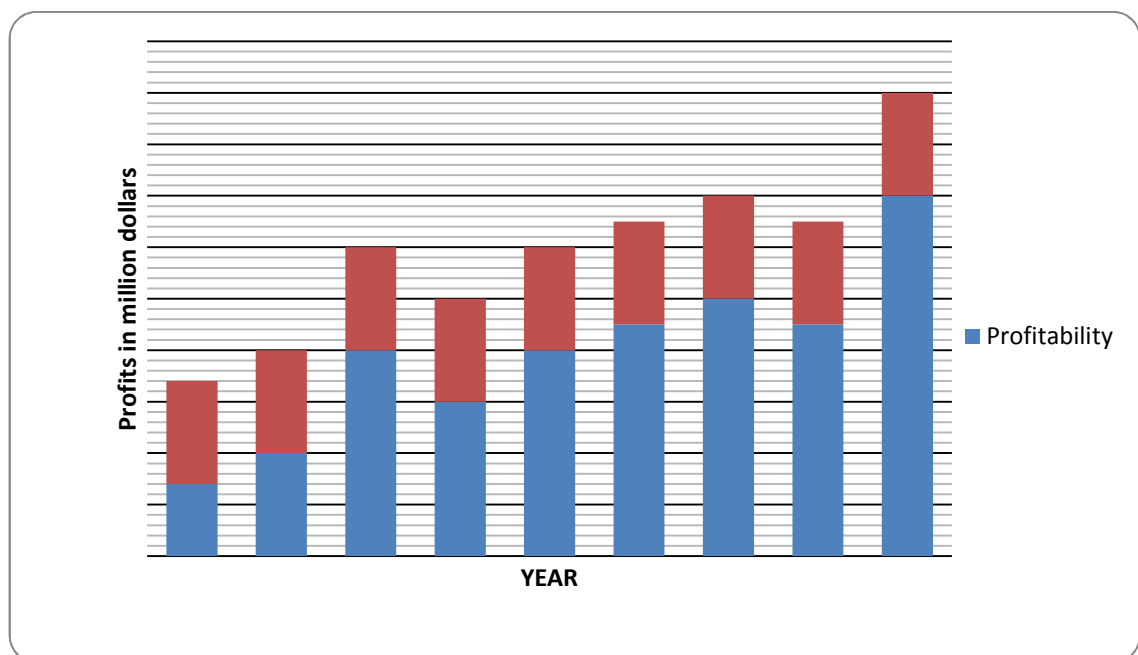
*Source: Figures compiled from various Dairibord Annual Reports*

The graph above shows that Dairibord’s profitability was declining for the period 2004 to 2009. Before implementing TQM, Dairibord was facing challenges in its operations with the PQD system which they had in play which impacted negatively on profitability. As shown by the graph in 2005 they had a profit margin of \$5,017million. As the years passed, Dairibord faced more challenges in their operations and costs increased which resulted in a continuous fall in their profit. In 2009, they had a profit of \$1,019million which was slightly below that of 2008 which was \$2,212million (Dairibord, 2009). This was due to the ineffective management system which they had (Dairibord, 2011).

This poses a lot of problems to the overall management. In my opinion, taking the way in which profit maximisation was done it was costing the organisation a lot rather than for it to be done in a cost saving way, standardising processes was therefore seen as a way of saving which brought TQM into practice. In today's business, purchasing has changed from being a cost centre to be a profit centre. The need to improve the quality of services which includes customer satisfaction and maximise profit has made the organisation to practice total quality management (TQM).

Dairibord adopted TQM in February 2010 and it adhered to the quality policy, which involves enablers for quality (Dairibord, 2010).

**Fig 1.2: Dairibord Profits after TQM implementation**



*Source: Figures compiled from various Dairibord Annual Reports*

From the graph above, it shows that there was an increase in profitability from 2010 after TQM was adopted. The study used 2 of the main products that are produced at Dairibord Zimbabwe Ltd (DZL). The researcher concentrated more on chimombe and yoghurt which contribute more of the firm's profits and the price trends of chimombe and yoghurt compared to their competitors are very similar.



### **1.3 STATEMENT OF THE PROBLEM**

In response to shrinking profitability and an increase in costs, Dairibord decided to adopt Total Quality Management (TQM) in 2010. In the past years, Dairibord has been using other systems which were found not to be so much effective on improving organisational profitability. The effect of the implementation of Total Quality Management on organisational competitiveness, cost reduction and more specifically on organisational profitability has not yet been evaluated. Furthermore, the role of critical factors required in enabling the effectiveness of Total Quality Management (TQM) and its effects on the firm's profit are only known theoretically with less empirical evidence. Hence this research aims to solve the problem of the decline in profits.

### **1.4 OBJECTIVES**

The primary objective of this research is to establish the effect of total quality management on organisational profitability.

The secondary objectives are:

- To establish whether TQM strategy enhances profits compared to a situation where it is absent.
- To find out how price of own good influence the organisation's profit.
- To identify the impact of quality on the firm's profitability.
- To establish how quantity of goods can affect organisational profitability.

### **1.5 RESEARCH QUESTIONS**

1. Does TQM improve organisation's profitability?
2. To what extent does the price of own good affect a firm's profitability?
3. Does quality affect the organisation's profitability?
4. How does quantity influence the firm's profitability?

### **1.6 STATEMENT OF HYPOTHESIS**

**H<sub>0</sub>:** TQM implementation result in an increase in organisational profitability.

## **1.7 SIGNIFICANCE OF THE STUDY**

To date few studies have integrated total quality management as an illustrative variable of profitability in Zimbabwe. The study will come up with evidence that gives an understanding of the impact of total quality management on performance that is Dairibord's profitability in the manufacturing sector in Zimbabwe. Moreover some manufacturing companies haven't adopted the total quality management system hence facing some problems with their performance, therefore this research will be suitable to advise such companies. Furthermore the study will be of academic importance as it used current data and contribute to information in developing countries using a unique model in analysing the data.

This research seeks to unveil the impact of total quality management on organisational profitability. It seeks to provide an insight to the policy makers on the best policies they can adopt to alleviate the effects of total quality management system (TQM) and how best they can utilize the TQM practices in their organisation. The research will help in the recommendation of different policies that will help in the manufacturing industry. The policies may include, the TQM enablers have to be provided and improved for success of total quality management and so as the firm's profitability.

## **1.8 ASSUMPTIONS**

The researcher assumes that:-

- ❖ All the sources of data to be used in this research provide true and fair results of the study, desk research used provides true and fair results and the researcher has no control of it since it was collected from different recommended websites and the other collected from company documents.
- ❖ The relevant authorities will be helpful in allowing access to the relevant information
- ❖ The quality management system is functioning effectively.

## **1.9 DELIMITATIONS**

The researcher focused on the impact of total quality management on organisational profitability at the main branch of Dairibord Zimbabwe Ltd for a period of 2004 to 2017. The research focused only with the Dairibord data sources.

## 1.10 LIMITATIONS

The researcher collected historical information for the period of 2004 to 2017 which is susceptible to bias. This is a systematic error caused by differences in accuracy or completeness of recollections retrieved by study participants regarding events or experiences from the past. In some instances price were more or less constant which would somehow affect our study by not giving a full reflection of the study. However the researcher used average annual prices of products. Some of the data was inaccessible due to the issue of confidentiality for example number of returns for the goods. To overcome this problem the research used average semi-annual returns as a measure of degree of quality.

## 1.11 DEFINITION OF TERMS

**Total quality management** is the attempts made to make the structures, procedures, customs, behaviour and even infrastructure in order to maintain customer satisfaction, coupled with the emphasis on compatibility, quality improvement and organizational competitiveness improvement (Lysons, 2010).

**Quality**- refers to conforming to set standards

**Quality management** -is a business tool for managing the organization's suppliers, processes, activities, resources, organizational culture, markets, customers etc. in order to ensure the delivery or achievement of quality processes, products and business results.

**Profitability** is the excess of revenues over the total costs of production. The excess Gain by the business after deducting total costs from total revenues is profit (Van Weele, 2002).

**Continuous improvement**-is an on-going effort to improve products, services, or processes. Quality management System-directs and controls those business activities which are associated with quality and documents a systematic approach to business objectives within the organization

## **1.12 SUMMARY**

This chapter has outlined the introduction, background of study, statement of the problem, research questions and objectives. More so it has covered the assumptions, significance of the study, delimitations and limitations, definition of terms. The next chapter will be looking at literature review of the study.

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

McMillan and Schumacher (2010) assert that literature review is a narrative interpretive criticism of the existing literature with a view to providing an understanding of the existing knowledge. Literature review may also be defined as the emphasis, of the literature of other authors on findings showing how total quality management affect organisational profitability (Crouch, 2003). This chapter gives an outline of the previously published information on effects of total quality management on overall organisation's profitability. This section also helps the researcher to analyse the findings of other authors. Literature review also summarises, compares and contrasts the works of key authors and highlights the work relevant to research. In this section theoretical framework of total quality management, empirical evidence and also the gap analysis of this study against other author's studies is also going to be looked at (Ku, 2010).

#### **2.2 THEORITICAL REVIEW**

##### **2.3.1 Deming's Theory**

The concept of Deming's (1986) chain reaction advocates, that improving quality would result in direct impact on the productivity and profitability of the firm. Deming's view indicates mainly the improvement of product quality and services by reducing uncertainties and variations involved in the project and in the production processes. It was the first model that involves quality. As a fundamental element to his ideas, Deming (1982, 1986) propounded the use of statistical techniques for quality control and also he presented his famous 14 Points, a set of principles aimed at changing the American management style. These 14 points were proposed basing on leadership, training of employees, right production at the initial stages, , improvement philosophy,

communication aimed at eliminating obstacles and suppression of quantitative objectives. For the achievement of quality one need to follow some steps or to have a sequence of activities or procedures. He also announces that service quality can be obtained through good coordination and combination of activities within an organisation. According to (DTI, 2013) Deming believed that adoption of, and action on, the fourteen points was a signal that management intended to stay in business. Deming also encouraged a systematic approach to problem solving and promoted the widely known Plan, Do, Check, Act (PDCA) cycle to lead improvement for quality and productivity. The PDCA cycle is also known as the Deming cycle. This theory is different from Gronroos's theory in the sense that it encompasses the involvement of everyone in the organisation to ensure successful implementation of TQM.

### **2.3.2 Resource Based View Theory**

According to (Curado, 2016) the basics of the resource-based view (RBV) of the firm can be found in the work by Penrose in the middle of the 20th century (1959) that conceived the firm as an administrative organization and a collection of productive resources, both physical and human. Material resources, as well as human resources, can provide the firm a variety of services. These resources can be used in different ways, according to the ideas of the firms on how to apply them. In this case, there is a positive relationship between the knowledge that people in the organization hold and the services obtained from the resources, so that firms are really repositories of knowledge.

The RBV of the firm focuses specially on the inside of the firm, its resources and capabilities so as to explain the profit and value of the organization (Curado, 2016). This theory is applied to explain differences in performance within an industry (Hoopes et al., 2003). Wernerfelt, 1984 cited in (Curado, 2016) that the RBV of the firm states that differences in performance happen when well succeeded organizations possess valuable resources that others do not have, allowing them to obtain a rent in its quasi-monopolist form.

The process of resource accumulation is considered to be a reflection of innovative and entrepreneur activities. Profits can only emerge from these activities if resource accumulation costs are inferior to the rents that those resources might actually produce

(Peteraf, 1993). Considering a strategic perspective of the RBV of the firm, the organization is a collection of unique competencies and capabilities influencing its evolution and its strategic growth options.

(Curado, 2016) postulates that the RBV of the firm is a suitable approach to understand competitive dynamics. Since Barney's paper in the early 90's (Barney, 1991), several authors approached the firm and its strategy from a resource-based perspective. Barney presented in his paper a method of analysis to identify the characteristics of firm resources that are able to generate sustained competitive advantage (Hoskisson et al., 1999). More recently Barney (Barney, 2001b) further developed his work, a decade after, contrasting the RBV of the firm to other theories, for many have been the developments and critics to his work since its publication in 1991.

The RBV of the firm considers that resources are not limited to the traditional economic productive factors; they also include socially complex resources, such as interpersonal relationships within firm managers, the firm's culture, or its reputation near the suppliers or clients (Barney, 1991). Physical resources may originate returns above average levels, but are the intangible resources, developed through a unique historical sequence and having a socially complex dimension, that are able to create and sustain competitive advantage of the firm. The RBV of the firm approach recognises the strategic importance of social and behavioural interactions in the conceivability of, the choice and the implementation of the organization's strategies. Intangible resources can hardly be changed, except in the long term. These intangible resources are frequently found in the organization in the form of tacit knowledge.

The resources are the basis of this theory and they explain the differences in performance between firms, as a consequence firms that possess certain competitive advantages obtain higher returns. On the other hand, resources are the basis of the organization's strategy and are used to implement it. Having this in mind we are able to observe the joint effect of resources and strategy in the organization's returns (Hitt et al., 2001). According to Barney (1991), following other authors, firm resources are the assets, the capabilities, the organizational processes, the firm attributes, the information, the knowledge, etc.

The strategic value of the organizations resources and capabilities can be increased by the difficulty of buying, selling, imitating or substituting them. The invisible asses, like tacit knowledge or trust, cannot be transacted or easily replicated by competitors, as they are usually founded in organizational history.

### **2.3.3 Crosby's Theory**

Philip Bayard Crosby is well known for his concept of “Zero Defects” and “Quality is Free”. His quality improvement process is based on:

- i) Quality is conformance to requirements
- ii) The system of quality is prevention
- iii) The performance standard is zero defect
- iv) The measurement of quality is the price of non-conformance

He believed that an efficient quality management must be “based on prevention based system”, and claimed that mistakes can happen because of lack of knowledge and the attention of employees in the organization. He emphasized when the quality improvement is done, management of the firm focuses more on prevention by the attention and awareness of employees, reduction of the cost, the emphasis on controls rather than the inspection efforts, and finally “Doing them right the first time”. Crosby realized that the cost of not doing things right the first time could be estimable. In production, the price of non conformance averages 40 percent of operating costs and the expenses of poor quality can be about 20% of revenues of a firm, most of which could be avoided by adopting good quality practices. The adoption of good quality practises would increase the firm's profit due to reduction of costs.

### **2.3.4 Systems Approach Theory**

System Approach Theory is a collection of interrelated parts working together towards a purpose Barnard cited in Schermerhorn (2005). According to the proponents of this theory organizations have been viewed as systems that achieve quality by incorporating the contributions of individuals to accomplish the common purpose through efficient operational performance. According to (Njuguna & Bett, 2018) the organization



management views the human, physical and informational aspects of his/her job as connected in an integrated whole. The management's job is to ensure that all sub-systems of the business institutions are coordinated internally so that the organization can accomplish its goals through operational performance. The Systems Approach recognizes the significance of environment for the organization's sustainability. It is up to the management to choose the management approach that suits him/her in order to have an effective and efficient organization that performs according to acceptable standards.

Boddy and Paton (1998) cited in (Njuguna & Bett, 2018) that it is of vital importance to note that no single management approach offers a complete solution and professionals need to use approaches collectively. These organization management approaches may be productive or unproductive depending on their application and appropriateness to given circumstances. This theory of quality management has recognized many quality management systems practices such as quality management systems practices which have been documented and empirically analysed in measurement studies and in studies that have investigated the relationship between quality management systems practices and performance. The theory therefore contends that TQM practices are the pivotal pillars in ensuring operational performance of any business entity.

### **Research Model 1**

$$Y = \beta_{ij}X_{ij} + \beta_0 + \mu_{ij}$$

Where Y represents the dependent variable of organizational performance, X represents a vector of TQM practices,  $\beta_s$  are parameters,  $\beta_0$  is the constant term, and  $\mu_{ij}$  represents the error term

The TQM practices are:

Leadership Commitment

Customer Focus

Employee Involvement

Continuous Improvement

Information Management

## Supplier Relationship

## Process Management

The research model above was used in one of the researches showing the positive relationship between all those variables (leadership commitment, customer focus, employee involvement profitability, information management, continuous improvement, supplier relationship, process management) and profitability. According to (Nguyen, Pham, & Pham, 2016) the TQM Pyramid is an adaptation of the Kanji and Asher pyramid model. It is a proper pyramid with a foundation and four sides and TQM is characterized by five principles:

1. Management's commitment (leadership).
2. Focus on the customer and the employee.
3. Focus on facts (information and process management).
4. Continuous improvements (Kaizen).
5. Everybody's participation.

The base or foundation of the pyramid represents management's commitment (leadership) and the four sides are the remaining four principles. A vital task for any management is to outline quality goals, quality policies and quality plans in accordance with the four sides of the TQM pyramid. These goals and policies should be clear and meaningful to all employees in the firm. It is very important that the firm's quality goals signal to employees that the firm's principal task is to satisfy its external customers and that this can only be achieved if the firm is able to exceed customers' expectations. Quality goals and quality policies must be followed by meaningful action plans. Experience from firms which have understood and realized the TQM vision shows that firms ought to concentrate on short-term plans (one year plan) and long-term plans, and the long term plans are often being three-year plans and are revised annually in connection with an annual quality audit. The annual quality audit is an essential part of the TQM vision and is much too important to be left to a central quality department. Only through active participation in the quality audit can top management acquire the necessary insight into the problems the firm has experienced. The annual quality audit gives top management the opportunity to put a number of important questions to department managers.

In this context, the researcher did not use the above this model because it required the researcher to gather information from different companies, which is cross-sectional data. The researcher wanted to concentrate more on Dairibord rather than other others. For instance to compare for leadership commitment, it required more than one organisation for effective results to be obtained.

## **Research Model 2**

$$PFY = \beta_0 + \beta_1 PRC + \beta_2 POS + \beta_3 QLTY + \beta_4 QNTY \dots\dots\dots 1$$

Where:

PFY= Profitability

PRC= Price of own good

POS= Price of substitute

QLTY= Quality

QNTY= Quantity

The above model shows the variables that affect profitability of an organisation. The study will be using the research model 2 to test for TQM on Dairibord's profitability.

## **Total Quality Management**

Quality of materials, products or services bought can be improved through a successful endorsement of the quality management system in procurement (Lysons et al, 2010). Total quality management is concerned with people and their attitudes and cannot be introduced on piece-meal basis. It starts with the evidence that all operations within an organisation contribute to final customer satisfaction (Hammond, 1994). It is like teamwork where people work as a team to meet one goal. Therefore TQM is "a system of continuous improvement employing participative management, centred on the needs of customers" (Jurrow & Bernard, 1993). In other words it is regarded as a management strategy aimed at embedding awareness of quality in all organisational processes, hence provide an umbrella under which everyone in the organisation can strive and create customer or client satisfaction at continually lower real costs.

Supply chain management has become a key component of company quality strategies. Thus, purchasing as a function has to be considered one of the most important functions among other functions in an organisation, participating in the strategic planning. It should therefore be allocated in top level of the hierarchy. Placing procurement at a top level or having a representative at the top level may make it possible for the recognition of its strategic importance (McCutcheon and Stuart, 1995).

Commitment from the top management is vital in the implementation of TQM in the purchasing function and success of TQM purchasing. A strong purchasing management commitment is characterised by establishment of quality objectives, plans, selection and evaluation of suppliers according to quality criteria, assessment of purchasing management performance against objectives and goals, effective communication to ensure that the goals are understood by all. Lascelles and Dale (1989) support the view that suppliers have become an important element of the quality improvement strategy in companies. Currently purchasing approach is characterised by long term or collaborative relationships with suppliers. The success of TQM purchasing also require the involvement at early stages of product design in manufacturing, information sharing between buyer and supplier and problem solving together.

## **2.4 EMPIRICAL EVIDENCE**

Despite the existence of a consolidated line of research focusing on the effects of Total Quality Management on various operational aspects of the firms, there are a lot of researchers who have shown academic interests on the effects of total quality management on purchasing performance.

In Powell's study (1995), data from 166 American firms were used to show that overall performance of TQM correlated positively and significantly with both implementing TQM and its degree of advancement or organizational performance. Although the empirical literature suggests a positive link between TQM and organizational performance, the level of contribution attributed to TQM was not large, suggesting that there could be other variables at play. Those variables could be the differences in the processes of implementing TQM with respect to economic trends, the type of industry,

the business environment including technology, competitiveness and market, corporate strategy, resources of firm, among others.

Ittner and Larcker (1997) adopted a sample of companies in the automotive and computer industries, with operations in Canada, Germany, Japan and the United States, using profitability as the dependent variable. The main interest of the study was to link processes management techniques to profitability increase. The results do not support the idea that process management contributes as a whole towards the financial performance, but that certain techniques had a positive impact while other ones practically did not influence the performance; to be specific, long term partnerships with suppliers and clients were related to the improvement of profitability, while training, payment based on quality and team work, and the organizational commitment with continuous improvement were not related to higher profitability.

Another study on ISO9000 certified organizations of Taiwan performed by Jeng (1998) examined the linkage between six Quality Management practices and quality performance. He found customer focus as the most powerful discriminating practice of quality performance while the remaining five practices showed low discriminating powers.

Fynes and Voss (2001) found that customer satisfaction is impacted in a positive manner by quality and design practices, although no significant effect was found of the customer satisfaction on the aggregate financial performance, a contradictory result compared with that found by Das et al. (2000). Kaynak (2003) validates a theoretical framework containing associations between quality management practices and performance measures (inventory, quality, market and financial).

Brah and Tee (2002) examined the relationship between TQM constructs and organization performance by measuring the quality performance of Singapore companies. They found that TQM and performance were positively correlated. Another wave of research has focused on the study between TQM and financial performance.

Prajogo and Brown (2004) conducted an empirical study on Australian organizations to investigate the relationship between TQM practices and quality performance. The results indicated a strong and positive linkage between those two variables

Cho and Pucik (2005) proposed a theoretical model including quality and also innovation, trying to test the direct effect of these practices, as well as its mediator effects, on growth, profit and market value. The model was tested utilizing structural equations, finding evidence of the relations among quality and profit. But it was not possible to observe the quality effect on growth, except when innovation was present as a mediator effect. The effect on market value was not tested directly, but only together with the moderator effects of growth and profitability.

High quality good or service may command premium price. When premium price is charged firms can enjoy high profit margins, even when their cost structures are comparable to that of their competitors. However, premium prices and market share may not be complimentary.

For example, Toyota and Honda despite their reputation of high quality do not charge premium. They are more interested in increasing their market share. Prices of different models of Toyota and Honda cars are average compared to same category cars produced by their competitors (Power report, the, 2002). There is a possible link, therefore, between quality and profit margins. Thus we compared the profit margins of award winners with those of control groups.

Demirbag (2005) and Fotopoulos et al (2009) studies show that firms that focus on improving the quality of their product and processes improve revenues and reduce costs. So the financial performance of a firm as a result of quality initiatives can be measured by the increase in the level of sales and revenues, the level of cost reduction, the return on investment, and by the increase in market share. Using operating income, sales, return on assets, return on sales as a measure of performance, they found that companies that had received a quality award outperform those that did not receive the awards. These results were confirmed by Lemak and Reed (1997) and others studies

Chipandambira, et al carried out an investigation of the performance indices in the food processing units in Zimbabwe in 2012. The paper showed a positive relationship between total quality management and production and they found out that total quality management plays a pivotal role towards the quality of the final product. The success

factors were highlighted which includes quality assurance, quality control, environmental, inventory maintenance and safety management.

Chepkoech and Muturi (2015) did an investigation on the effects of leadership on total quality management and total quality management on purchasing efficiency in Public companies in Kenya: A survey of selected public companies in South Nyanza. The study used both quantitative and qualitative data, descriptive and inferential statistics was used to analyze data. Their results show that leadership has a great impact on TQM and purchasing efficiency.

More recently Hemsworth (2016) carried out a meta-analysis on the effects of implementation of the European Foundation for Quality Management (EFQM) Excellence Model in neglected purchasing units in the Canadian manufacturing sector. The study focused on the crucial concepts of quality management, internal customer satisfaction, and organizational performance using the existing literature on the basis of the European Foundation for Quality Management Excellence Model. The results showed that the EFQM model improves internal customer satisfaction and organizational performance.

## **2.5 GAP ANALYSIS**

Most of the reviewed literature has been carried out in developed countries, where TQM has been implemented to its highest level. The present study is exceptional, because it is being carried out in Zimbabwe, a developing country. Critical factors required for successful implementation of TQM, such as training, adequate remuneration, provision of suitable and adequate resources, infrastructure and technology have rarely been identified and analysed in literature which must be taken note of.

## **2.6 SUMMARY**

This chapter focused on giving a theoretical and empirical framework on where the research is built upon. The chapter tries to analyse the literatures that have been written on the topic under study. The chapter rolls to an end with the research gap analysis which is a justification on the distinctiveness and significance of the research in the face of many other researches which have been conducted on the topic.

## **CHAPTER III**

### **METHODOLOGY**

#### **3.1 INTRODUCTION**

This chapter presents the research methodology used in carrying out the research. It outlines the model specifications, which are theoretical and empirical, justification of variables and the estimation procedure, diagnostics test, data sources and the conclusion



of the chapter. This chapter provides a brief explanation on the analysis of data and how data will be presented in order to meet the research objectives and questions

### **3.2 THEORETICAL MODEL**

We are going to adopt the Deming (1982, 1986) model which had the long life mission of improving quality. After World War II, the industrial manufacturers in Japan produced poor quality items. In a response to this, the Japanese Union of Scientists and Engineers invited Dr. Deming to train engineers in quality processes (Martin, 2019). Quality control was an integral part of Japanese manufacturing and was adopted by all levels of workers within an organization. With the statistical quality control system, the main aim was to make sure that quality products were produced and to maintain the standard. The new wave of quality control became known as Total Quality Management, which was used to describe the many quality-focused strategies and techniques that became the centre of focus for the quality movement to improve a firm's performance (Martin, 2019). Hence profitability is affected by many variables. Deming adopted a research model to see if the variables attributed to a firm's profitability and other variants. The model states that:

$$Y_P = f(X_{Q_{TLY}})$$

Where:

$Y_P$  = Profitability

$X_{Q_{TLY}}$  = Quality of product

He further argued that quality is affected by different quality systems such as total quality management (TQM), statistical quality control (SQC). The statistical quality control method provided a statistical method of quality based on sampling. Where it was not possible to inspect every item, a sample was tested for quality. The theory of SQC was based on the notion that a variation in the production process leads to variation in the end product (Martin, 2019). If the variation in the process could be removed this would lead to a higher level of quality in the end product.

Quality was defined as:

$$Q = f(\text{systems to manage quality})$$

Since in our case TQM is the system that is being implemented and that we intend to evaluate hence:

$$Y_p = f(\text{TQM})$$

### 3.3 EMPIRICAL MODEL

Drawing from other theoretical models and empirical studies, we going to analyse the impact of total quality management (TQM) on organisational profitability as explained below:

Price of own good (PRC), quality of the goods (QLTY), price of substitutes (POS) and quantity produced (QNTY) are the variables that are going to be used in this study.

Subedi, D and Maheshwari, S, in their study justified that high quality goods or service may command premium price. When premium price is charged firms can enjoy high profit margins, even when their cost structures are comparable to that of their competitors (Subedi & Maheshwari, 2007). However price of substitute also affect a firm's profits. When a competitor's price is lower than that of our own organisation then it affects the profits negatively. Therefore price of own good and price of substitutes are part of the variables that are going to be used in this research.

$$Y_p = f(\text{PRC, POS}) \dots\dots\dots 2$$

Where:

$Y_p$  = Profitability

PRC = Price of own good

POS = Price of substitute

Cho and Pucik (2005) cited in (Pignanelli & Csillag, 2018) that a theoretical model including quality and also innovation, try to test the direct effect of these practices, as well as its mediator effects, on growth, profit and market value. The model was tested utilizing structural equations, finding evidence of the relations among quality and profit. The effect on market value was not tested directly, but only together with the moderator effects of growth and profitability (Pignanelli & Csillag, 2018). Therefore, quality will be part of the model as shown below:

$$Y_p = f(\text{PRC}, \text{POS}, \text{QLTY}) \dots\dots\dots 3$$

According to Easton and Jarrell (1998), quantities achieved can be a measure of a firm's profitability. If more products are produced, it means that the firm will sell more and hence will lead to an increase in profitability hence we going to use quantity as part of the variables.

$$Y_p = f(\text{PRC}, \text{POS}, \text{QLTY}, \text{QNTY}) \dots\dots\dots 4$$

A dummy variable D1 was used to measure for the 2 periods, before and after total quality management system was implemented, where the D1 assumes the value of 1 where TQM was in place and 0 otherwise.

Hence our final model will be like:

$$PFY = \beta_0 + \beta_1 \text{PRC} + \beta_2 \text{POS} + \beta_3 \text{QLTY} + \beta_4 \text{QNTY} + \beta_5 \text{D1} + \mu$$

Where:

PFY= Profitability

PRC= Price of own good

POS= Price of substitute

QLTY= Quality

QNTY= Quantity

D1= Dummy for TMQ (total quality management)

$\beta_0 + \beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5$  = Parameters to be estimated

$\mu$  = error term

### 3.4 JUSTIFICATION OF VARIABLES

#### Dependent Variable

##### 3.4.1 Profitability

Profitability is a business's ability to produce a return on an investment based on its resources in comparison with an alternative investment. It is the degree to which a

business or activity yields profit or financial gain. It is one of the crucial elements to measure a company's performance. We did an average semi annual analysis to measure the profitability.

### **Independent Variables**

#### **3.4.2 Price (PRC)**

In this research price is given as average market price for chimombe and yoghurt sold over a period of 6 months, the first semi-annual and the second semi-annual average. Under normal circumstances, when prices are high, it means that supply increases which will lead to an increase in profitability of a firm. A decrease in price might be because of many reasons upon the firm's decisions. It might be, to out compete others, or they could have produced at a low cost, or just to maintain their position in the industry. The prices used were an average price of 6 months and there more or less constant during some years. The expected sign of price is as positive sign.

#### **3.4.3 Quality (QLTY)**

Quality was measured using the average returns for chimombe and yoghurt that the firm had during the 2 semi-annual periods. According to (Lysons K, 2010), were a good is of quality, there will not be any returns to the firm hence a good is regarded to be of quality. If the goods are of high quality, it means that it will fetch for a high price which will lead to an increase in profits. More so according to (Subedi & Maheshwari, 2007) High quality good or service may command premium price. When premium price is charged firms can enjoy high profit margins, even when their cost structures are comparable to that of their competitors. The expected sign of quality is a positive sign.

#### **3.4.4 Quantity (QNTY)**

Quantity was measured using the average semi annual quantity of chimombe and yoghurt produced. According to Easton and Jarrell (1998), quantities achieved can be a measure of a firm's profitability. If more products are produced, it means that the firm will sell more and hence will lead to an increase in profitability

### **3.4.5 Dummy Variable (D1)**

The researcher used D1 to measure total quality management (TQM) where the dummy value assumes the value of

1: where TQM was in place

0: where TQM was not in place

It is measuring the two periods before and after total quality management (TQM) was implemented. This was the main variable in play to measure for profitability.

### **3.5 ESTIMATION PROCEDURE**

The study is going to use the ordinary least squares (OLS) method to estimate the impact of total quality management on organisational profitability of Dairibord Ltd Zimbabwe. This method has been effectively used by previous similar studies. The model includes the error term with a sum equal to zero because normally the positives and negatives tend to cancel each other. The ordinary least squares method is used to estimate the parameters. The model indicates that there is no multicollinearity and also no covariance between the error term and explanatory variable such that:  $E(\mu_1, x_1) = 0$ . The error term  $\mu = \sum \mu = 0$  follows a normal distribution and variance zero. This model presupposes that parameters are linear and variables are non-linear and that there is a difference of X values meaning that X values in a given sample must not be the same.

### **3.6 DIAGNOSTIC TESTS**

#### **3.6.1 Test for Heteroskedasticity**

It checks for the behaviour of the variance and the relationship between the squared residuals and the explanatory variables. To test for the presence of heteroskedasticity the Breusch-Pagan test is conducted using the F-statistic to check if regression is significant. If F-statistic is greater than critical value 0 we accept the null hypothesis implying that the variance is heteroskedasticity.

#### **3.6.2 Multicollinearity**

Multicollinearity test is done to test for correlation between independent variables. If any coefficient has a value greater than 0.8 we can confirm the presence of

multicollinearity hence the variable need to be left out. Multicollinearity may result to an insignificant t-statistic and f-statistic.

### **3.6.3 Autocorrelation Test**

In this study autocorrelation test is made using the Durbin Watson test and Breusch-Godfrey Serial Correlation LM test. Autocorrelation is when there is covariance between the error term and the independent variable. The test follows that the null hypothesis there is no autocorrelation and the first hypothesis there is autocorrelation.

### **3.7 SECONDARY DATA**

This research is quantitative in terms of its analysis therefore secondary data is used. Secondary data is used as there is likely to be higher quality data compared to collecting own data. The data was collected using company documents and to make sure all data was captured the researcher used a checklist.

The key drive of checklist is to give attention to several characteristics of an object or situation to identify that nothing of significance was ignored. The researcher used a document checklist to identify the documents that were used in the organization. More so the researcher used published reports to collect data. The study used data from archived records and this helped to analyse the trends in the organisational performance of DZPL. Data was collected on a semi-annual basis from 2004-2018

However, secondary data sources have a major drawback of failure to give explanations and occurrences of certain events. Thus, there exists a problem of accuracy. Therefore the checklist was used to check for accuracy of the data collected.

### **3.8 SUMMARY**

The chapter looked at the theoretical model, empirical model, and justification of variables, estimation procedures, data issues and diagnostic tests. The main objective of this chapter was to explore the theoretical methodology to be used in assessing the relationship between inventory management and fertiliser supply. Results are presented in chapter IV.

## **CHAPTER IV**

### **DATA PRESENTATION, ANALYSIS AND RESULTS**

#### **4.0 INTRODUCTION**

This chapter focuses on presentation of the research findings and analysis to answer the research objectives stated in Chapter one relating the answers to the obtained results after data estimation using regression analysis. Data was analysed using Ordinary Least Squares (OLS) method using econometric software E-Views (Version 10). The results are presented as follows:

## 4.1 DESCRIPTIVE STATISTICS

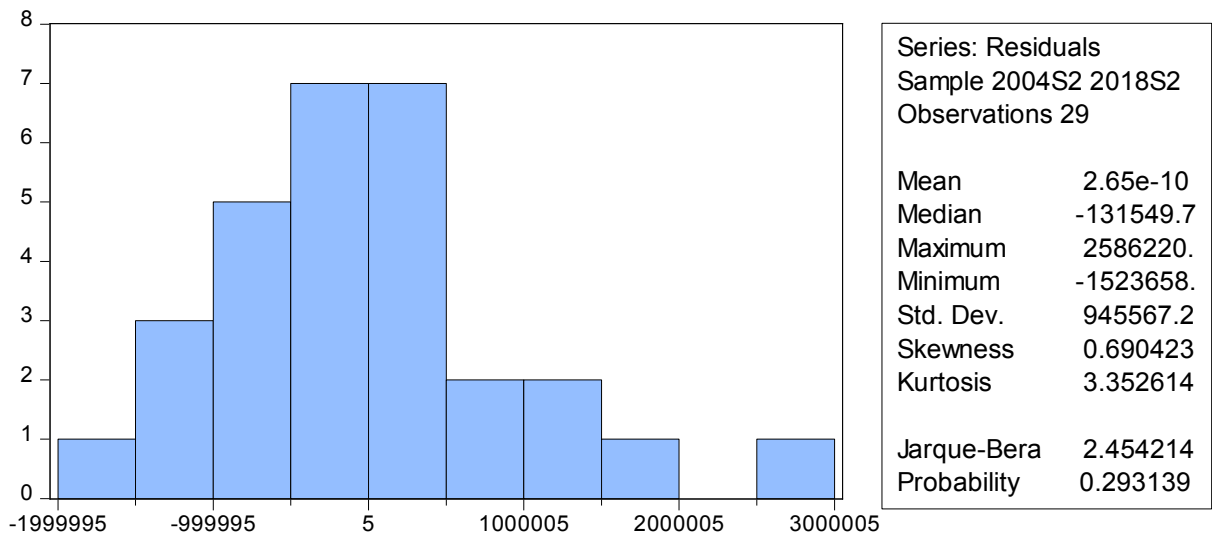
**Table 4.1: Descriptive Statistics**

	<b>PFY</b>	<b>PRC</b>	<b>QNTY</b>	<b>QLTY</b>
<b>Mean</b>	2496895.	0.595000	14683.20	30128.06
<b>Median</b>	863483.0	0.550000	12678.00	18196.97
<b>Maximum</b>	9800079.	1.200000	30103.00	136906.5
<b>Minimum</b>	115210.0	0.350000	4330.000	1000.846
<b>Std. Dev.</b>	2899904.	0.216648	8164.568	34989.83
<b>Skewness</b>	1.024928	1.320158	0.354363	1.623692
<b>Kurtosis</b>	2.623331	4.736144	1.686541	4.857945
<b>Jarque-Bera</b>	5.429740	12.48183	2.784332	17.49682
<b>Probability</b>	0.066214	0.001948	0.248536	0.000159
<b>Observations</b>	30	30	30	30

The table above shows that profitability (PFY) had an average of 2496895.0. Its maximum was **9800079.0** and the minimum was **115210.0**. Price of own good (PRC) recorded an average of **0.595000** and it was between a range of **0.350000** and **1.200000**. More so quantity (QNTY) had an average mean of 14683.20 and was between a range of **4330.000** and **30103.00**. The average for quality (QLTY) was **30128.06** and the maximum was **136906.5** and a minimum of **1000.846** was recorded.

3 of our model variables are not normally distributed according to the Jarque-Bera therefore need to test for the normality of the error term. We test for the error term because it is a linear combination of those variables and linear combination of normal distribution is itself normal. To justify use the parametric test, it is the error term or residuals that have to be normally distributed hence perform the normality test for the residuals.





The linear depicted the combination of the variables by the error term as normally distributed since the error term ‘e’ is normally distributed with a value of 0.293139 hence we fail to reject the null hypothesis.

We removed POS that is price of substitute because it was almost the same variable with price of own good. We did not have any major problems with our model hence we continued with the estimation.

## 4.2 RESULTS OF THE MODEL’S DIAGNOSTIC TESTS

### 4.2.1 Multicollinearity Test

In order to determine that the correlation between the illustrative variables is between the acceptable limits, a Multicollinearity test was done using the correlation matrix and the results are presented in table 4.2

**Table 4.2: Correlation Matrix**

	PFY	PRC	QNTY	QLTY
PFY	1.000000	0.284519	0.387456	0.705161
PRC	0.284519	1.000000	0.895031	-0.178173

QNTY	0.387456	0.895031	1.000000	-0.198192
QLTY	0.705161	-0.178173	-0.198192	1.000000

Multicollinearity is always present in time series data and researchers are worried about its degree not its presence and the rule of thumb is that the correlations of explanatory variables should be less than 0.8. From the results shown in Table 4.2 some of the variables have correlations which are below 0.8 and this proves the absence of a high degree or perfect correlation between the explanatory variables, although we had PRC and QNTY having a value which is more than 0.8. Since in the presence of autocorrelation our results are still unbiased and consistent and given that the variables price of own good and quantity are critical variables in the model building exercise such that dropping one of the variables a bigger evil. We adopted the do nothing approach to the multicollinearity test since there were no major problems hence had to continue using the model with both the variables.

#### 4.2.2 Heteroscedasticity

This means the absence of homoscedasticity which means the variances of the variables are not equal. If data estimation proceeds with heteroscedastic data the confidence interval will be too wide and this reduces the evidence of rejecting the null hypotheses (significance level). Heteroscedasticity was tested using the Heteroscedasticity White Test without cross terms and its summarized results are presented in table 4.3

**Table 4.3: White Heteroscedasticity Test**

F-statistic	1.285306	Prob. F(6,22)	0.3646
Obs*R-squared	7.527078	Prob. Chi-Square(6)	0.3272
Scaled explained SS	4.827120	Prob. Chi-Square(6)	0.5095

The table above shows results that, the Probability value is 0.3646 which is greater than that of the observed R squared which is 0.3272 hence we accept that data has no heteroscedasticity. F statistic probability value is greater than 0.1 hence there is no heteroscedasticity therefore we accept the null hypothesis at 10% significance.

### 4.2.3 Autocorrelation Test

Autocorrelation is a situation where there is covariance between the error term and the explanatory (independent) variables. It is also called serial correlation. In this case Breusch-Godfrey Serial Correlation LM Test was carried out to test for autocorrelation due to the weakness of Durbin Watson (region of indecision). The results are shown in the table below.

**Table 4.4: Serial Correlation LM Test**

F-statistic	11.73449	Prob. F(2,22)	0.0003
Obs*R-squared	15.48461	Prob. Chi-Square(2)	0.0004

The results indicated that there is autocorrelation since the p value of the Serial Correlation LM Test of 0.0003 shows that there is evidence of rejecting the null hypothesis and that there is no autocorrelation. To correct for autocorrelation, the Cochrane-Occut Iterative procedure was to be run as a remedial measure. The procedure works through including the lagged dependent variable. The autocorrelation was corrected for at first lag and the results are as follows:

**Table 4.5: Corrected Serial Correlation LM Test**

F-statistic	0.060686	Prob. F(2,20)	0.8210
Obs*R-squared	0.174929	Prob. Chi-Square(2)	0.7635

The Probability of the F-statistic is 0.8210 which is greater than that of the data or observed R squared of 0.7635 hence we accept the null hypothesis that there is no autocorrelation between the error term and the explanatory variables and there is no systematic pattern followed by the error term.

### 4.2.4 Model Significance

R-Squares describe the extent to which the dependent variable is explained by the independent variables. As evidenced, R-squared is 0.89508 meaning that about 89.5% of variations in the profitability are being explained by the variation in the independent

variables. Only about 11% of the variations are explained by the error term and some other variables not included in the model. This shows that the model is effective for the study.

The model is correctly specified with the probability value of the F-statistics is 0.000000 which is less than 0.01 in explaining the variations in profitability. This means that the model is significant at 1% level of significance and we have 99% confidence that the model is correctly specified.

### 4.3 REGRESSION MODEL RESULTS

**Table 4.3.1: Regression Results**

Dependent Variable: PFY				
Method: Least Squares				
Included observations: 29 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	72663.92	842183.9	0.086280	0.9320
PRC	-2063180.	2516881.	-0.819737	0.4208
DPFY	-0.522010	0.125378	-4.163476	0.0004
D1	2809348.	938197.0	2.994412	0.0065
QNTY	130.1938	68.86570	1.890546	0.0713
QLTY	41.56864	7.868483	5.282930	0.0000

R-squared 0.895028

Adjusted R-squared 0.872208

Durbin Watson stat 1.574930

F-Statistic 39.22135

Prob (F-Statistic) 0.000000

The linear regression model after estimation will be:

$$PFY = 72663.92 - 2063180.0PRC - 0.522010DPFY + 2809438.0D1 + 130.1938QNTY + 41.56864QLTY$$

## **4.4 INTEPRETATION AND DISCUSSION OF RESULTS**

### **4.4.1. Quantity (QNTY)**

Quantity has a probability value (P-value) for the t-statistic of 0.0713, this means that it is statistically significant at 10% significance level and we can reject the null hypothesis that the coefficient of QNTY is not significantly different from zero in favour of the alternative hypothesis. This means that the variable quantity is important in explaining variations in profitability. The coefficient of QNTY is +130.1938 and this shows that quantity has a positive relationship with profitability. An increase in average quantity of chimombe and yoghurt will result in an increase in profitability by \$130 in 6 months period *ceteris paribus*.

From the results shown above, there is a positive relationship between quantity and profitability. This goes hand in hand with theory which states that an increase in the quantities will lead to an increase in the organisational profitability through an increase in total revenue (Fields, Hague, Melby, Lommel, & Koby, 2017).

### **4.4.2 Quality (QLTY)**

Quality (QLTY) has a probability value for the t-statistic of 0.0000 and this means that it is significant at 1% significance level, therefore we reject null hypothesis that the coefficient is not significantly different from zero in support for the alternative hypothesis. The coefficient of QLTY is +41.56864, which denotes a positive relationship with the dependent variable. An average increase in the number of returns by 1 unit will lead to an increase in profit by \$41.

Our result for the quality variable proxied by the number of returns is counter theoretical expectations. May be this was because there are loyal customers to which Dairibord accepts returns which then makes people confident to even buy more products from the firm knowing that if there are any defective goods, they can return them without any hustles. More so maintaining good relations with customers could have resulted in an increase in profitability through the acceptance of defective goods. However, according to Lysons K (2010) an increase in quality of the goods or services should lead to an increase in a company's profitability. This increase in quality usually fetches for an

increase in price hence an increase in the profits. In other studies done by Dr Juran shows that quality is controlled in different dimensions and it still leads to an increase in profits. He said that there is quality control, quality planning and quality improvements.

#### **4.4.3 Dummy Variable for TQM (D1)**

D1 has a probability value for the t-statistic of 0.0065 which shows that the coefficient of D1 is statistically significant at 1% significance level. Hence D1 is significant in explaining the variations in profitability. D1 shows that there is a positive relationship between TQM and profitability with a coefficient of +2809348. Having TQM in place, it enhances profits by \$2,809,348 on average for the 6 months compared to a situation where TQM is not being practiced.

The results support that there is a positive relationship between TQM system and profitability. It has so many dimensions or practices that go hand in hand with it for it to be more successful (Nguyen et al., 2016). In addition, Juran (1986) pointed out the significance of both technical and managerial aspects. The technical aspects can include technological support and audits to check on improvements and managerial aspects which have to do with leadership styles used in the organisation, monitoring and control of the way in which employees attend to clients both internal and external. This enhances more effectiveness of the TQM system on organisational performance.

More so, according to (Ngambi, 2017) TQM is a concept based on continuous improvement in the performance of processes in an organization and in the quality of the products and services that are the outputs of those processes. Quality advocates like Juran, Deming among others have identified several critical principles for successful TQM practices which among others include: top management commitment, customer focus, supplier relationship, benchmarking, quality-oriented training, employee focus, zero-defects, process improvement and quality measurement (Saraph et al, 1989). An effective use of these practices leads to a positive increase of an organisational performance.

From the results obtained, it also shows that there was a positive relationship with profitability which is also shown from the theories and other empirical studies. The

results found were similar with that of Ngambi 2017 because there some variables used were similar, however there were done using different measures and also that, most of the studies were done in developed countries.

#### **4.4.4 Price (PRC)**

Price has a probability value (P-value) for the t-statistic of 0.4208 which means that it is not significant in explaining the variations of profitability. This is probably because DZL is the giant in the dairy sector, which makes people less price sensitive for their products. In addition since DZL has a reputation, loyal customers may be less sensitive to price changes which eventually do not affect profitability.

#### **4.4.5 DPFY Lagged Variable for Profitability (PFY)**

This variable is significant based on the Cochrane-Occut procedure which was done because our model was suffering from autocorrelation. It came into play to correct for the autocorrelation

#### **4.6 Summary**

From the ordinary least squares estimation it reflects that there is a positive relationship between quality, quantity and profitability. The next chapter will focus on conclusions and policy recommendations and opportunities for further study and research.





## CHAPTER V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 SUMMARY

The objective of the study was to investigate the impact of total quality management on organisational profitability of Dairibord Zimbabwe Ltd. Independent variables namely quality, quantity, price of own good and price of substitute, were considered to test out their effect on profitability of Dairibord Zimbabwe Ltd. Moreover interaction dummies were also used in the study these included D1 an interaction dummy for total quality management.

Results of the study showed that there is a positive relationship between quality and profitability as indicated with a positive coefficient of 41.56864. Quantity also showed a positive relationship with profitability with a coefficient of 130.1938. D1 an interaction dummy of TQM with a coefficient of 2809348. has positive relationship with profitability. However price had a negative relationship with profitability with a coefficient of -2063180. The study concluded that total quality management positively affect Dairibord's profitability

#### 5.2 CONCLUSIONS

The main conclusion drawn from the study was that most of the factors affect profitability positively. From the summary above most of the variables used, have a positive relationship with profitability. From the results, an increase in quantities produced, will lead to an increase in profitability. If Dairibord produces more, it means that it will sell more, and earn more revenues. An increase in revenue and sales will directly affect the company's profitability in a positive way.

More so, we can conclude that an increase in the quality of goods, will lead to an increase in profit. From the results shown above, quality goods fetch for a high price, which will lead to high profits being earned through an increase in sales revenue. In addition, D1 which is the dummy interaction for TQM has a strong positive relationship with profitability. Practicing the TQM system will attract more profits to the organisation. However, price had a negative relationship with profitability. This might

be so because people do not buy more if the prices are high, means that they would not afford to buy more.

### **5.3 RECOMMENDATIONS**

- ❖ Dairibord should maintain the TQM system and possibly improve on other areas of the system that they were not fully implementing to realise better returns in terms of profitability. In addition other companies within the dairy sector that have not yet adopted TQM should adopt it as it yields better performance in as far as profitability is concerned.
- ❖ In order to improve customer loyalty and boost market share Dairibord should maintain good customer relations through accepting returns for defective goods as it has proved that acceptance of defective goods increases profitability
- ❖ The researcher recommends that Dairibord continue to improve their quality to increase its market share through more sales.
- ❖ Recommends that Dairibord produces more quantities to earn more revenues.

### **5.4 AREA FOR FURTHER RESEARCH**

There is need to examine more variables that influence profitability in the manufacturing sector. More so, further studies can be done in other industries like the service sector.

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## **APPENDIX 1: REGRESSION RESULTS**

Dependent Variable: PFY

Method: Least Squares

Date: 04/10/19 Time: 21:34

Sample (adjusted): 2004S2 2018S2

Included observations: 29 after adjustments

White-Hinkley (HC1) heteroskedasticity consistent standard errors and  
Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DPFY	-0.522010	0.125378	-4.163476	0.0004
D1	2809348.	938197.0	2.994412	0.0065
C	72663.92	842183.9	0.086280	0.9320
PRC	-2063180.	2516881.	-0.819737	0.4208
QNTY	130.1938	68.86570	1.890546	0.0713
QLTY	41.56864	7.868483	5.282930	0.0000
R-squared	0.895028	Mean dependent var		2575560.
Adjusted R-squared	0.872208	S.D. dependent var		2918477.
S.E. of regression	1043296.	Akaike info criterion		30.73566
Sum squared resid	2.50E+13	Schwarz criterion		31.01855
Log likelihood	-439.6671	Hannan-Quinn criter.		30.82426
F-statistic	39.22135	Durbin-Watson stat		1.574930
Prob(F-statistic)	0.000000	Wald F-statistic		30.70949
Prob(Wald F-statistic)	0.000000			

## APPENDIX 2: DESCRIPTIVE STATISTICS

	PFY	PRC	QNTY	QLTY
Mean	2496895.	0.595000	14683.20	30128.06
Median	863483.0	0.550000	12678.00	18196.97
Maximum	9800079.	1.200000	30103.00	136906.5
Minimum	115210.0	0.350000	4330.000	1000.846
Std. Dev.	2899904.	0.216648	8164.568	34989.83
Skewness	1.024928	1.320158	0.354363	1.623692
Kurtosis	2.623331	4.736144	1.686541	4.857945
Jarque-Bera	5.429740	12.48183	2.784332	17.49682
Probability	0.066214	0.001948	0.248536	0.000159
Sum	74906864	17.85000	440496.0	903841.9
Sum Sq. Dev.	2.44E+14	1.361150	1.93E+09	3.55E+10
Observations	30	30	30	30

### APPENDIX 3: MULTICOLLINEARITY TEST

	PFY	PRC	QNTY	QLTY
PFY	1.000000	0.284519	0.387456	0.705161
PRC	0.284519	1.000000	0.895031	-0.178173
QNTY	0.387456	0.895031	1.000000	-0.198192
QLTY	0.705161	-0.178173	-0.198192	1.000000

### APPENDIX 4: HETEROSKEDASTICITY TEST

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.146913	Prob. F(5,23)	0.3646
Obs*R-squared	5.787536	Prob. Chi-Square(5)	0.3274
Scaled explained SS	4.282269	Prob. Chi-Square(5)	0.5095

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 04/15/19 Time: 10:46

Sample: 2004S2 2018S2

Included observations: 29

White-Hinkley (HC1) heteroskedasticity consistent standard errors and covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7.32E+11	6.07E+11	-1.205285	0.2403
PRC	2.02E+12	1.78E+12	1.135736	0.2678
QNTY	-27789295	64202026	-0.432841	0.6692
QLTY	12828736	13634407	0.940909	0.3565
D1	5.55E+11	1.13E+12	0.491742	0.6276
DPFY	22229.11	124555.0	0.178468	0.8599

R-squared	0.199570	Mean dependent var	8.63E+11
Adjusted R-squared	0.025564	S.D. dependent var	1.35E+12
S.E. of regression	1.33E+12	Akaike info criterion	58.85257
Sum squared resid	4.07E+25	Schwarz criterion	59.13546
Log likelihood	-847.3622	Hannan-Quinn criter.	58.94117
F-statistic	1.146913	Durbin-Watson stat	1.659252
Prob(F-statistic)	0.364602		

### APPENDIX 5: SERIAL CORRELATION LM TEST

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.199103	Prob. F(2,21)	0.8210
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Obs\*R-squared                      0.539670    Prob. Chi-Square(2)                      0.7635

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Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 04/15/19    Time: 10:44

Sample: 2004S2 2018S2

Included observations: 29

Presample missing value lagged residuals set to zero.

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	20514.07	857897.6	0.023912	0.9811
PRC	279960.1	2256103.	0.124090	0.9024
QNTY	-8.684592	86.59224	-0.100293	0.9211
QLTY	-1.819188	9.632271	-0.188864	0.8520
D1	145104.8	1104278.	0.131402	0.8967
DPFY	-0.035823	0.138873	-0.257956	0.7990
RESID(-1)	0.167836	0.275077	0.610142	0.5483
RESID(-2)	-0.010575	0.265965	-0.039760	0.9687

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R-squared	0.018609	Mean dependent var	2.89E-10
Adjusted R-squared	-0.308521	S.D. dependent var	945567.2
S.E. of regression	1081640.	Akaike info criterion	30.85481
Sum squared resid	2.46E+13	Schwarz criterion	31.23199
Log likelihood	-439.3947	Hannan-Quinn criter.	30.97294
F-statistic	0.056887	Durbin-Watson stat	1.768560
Prob(F-statistic)	0.999638		

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