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MASTERS OF SCIENCE DEGREE IN PURCHASING AND SUPPLY CHAIN MANAGEMENT

FACTORS INFLUENCING THE CHOICE OF MATERIAL HANDLING SYSTEM IN ZIMBABWE: A CASE OF DELTA BREWERY COMPANY IN ZIMABWE

BY

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APPROVAL FORM

The undersigned certify that they have read and recommended to Bindura University of Science Education (BUSE) for acceptance a Dissertation entitled **"Factors Influencing The Choice Of Material Handling System in Zimbabwe: A Case Of Delta Brewery Bulawayo [January 2020 To December 2022]"** by Christian Chipara in partial fulfillment of the requirements for the degree of Master of Science in Purchasing and Supply Chain Management

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ABSTRACT

The study focused on interrogating factors influencing the choice of material handling system in Zimbabwe. A case study of Delta Breweries Bulawayo was used with a specific consideration of periods from January 2020 to December 2022. This was after a realization of increased cost arising from poor choices which would also complicate the ability of an organisation to efficiently deliver goods and services to ultimate clients. In order to fully canvass and elucidate on the key factors that can be employed, the study was guided by the following objectives; to canvass factors influencing the choice of material handling systems in Zimbabwe focusing on a case of Delta Breweries Bulawayo, to establish the impact of choice of material handling systems on the competiveness of Delta Breweries Bulawayo and to solicit recommendations which informs policy guidance when selecting material handling systems at companies in Zimbabwe. Pertinent research questions were constructed to address the study objectives. Relevant literature from journals, policy documents and official reports was reviewed to provide a detailed understanding and exposition of pertinent study variables in the field of material handling and on the key factors critical in the selection of material handling systems. The study imported pertinent theories from prominent proponents to formulate a comprehensive theoretical framework which gave guidance and solid grounding. The models upon which the study was hinged are the Ideal System Approach, Material Handling System Design and the Transactional Cost Economics Theory. The models provided imperative lenses through which the current study could be located. The study adopted quantitative and qualitative approaches simultaneously. A case study was employed in the study. Stratified sampling technique was used to select a sample of 102 respondents. It was justifiable under the circumstances due to the stalemate of asymmetry in objects distribution which were heterogeneous. Quantitative analysis was applied on close ended questions and qualitative analysis on open ended questions. Descriptive statistics were used to analyse quantitative data whilst qualitative data was analyzed using the traditional text analysis in the form of themes. There is abundance of evidence from the statistical metrics that cost, quality, lead time, load capacity, accessibility and adaptability as the key factors to be imported into consideration when deciding on the best material handling system. It was recommended that there be construction of clear organisational goals so that choices are in sync with ultimate organisational desires, construction of a comprehensive catalog of factors to be considered as a matter of policy when deciding material handling system, it was recommended that technological perspectives of material being considered should always be considered.

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CHAPTER ONE

THE BACKGROUND AND ITS SETTING

1.0. Introduction

Material handling is regarded as an integral part to the success of any organization. Many manufacturing sectors in Zimbabwe use different types of material handling systems for their warehouse from the manual, automated and mechanical material handling system. One of the colossal challenges of improper choices is the consequential disproportionate cost arising from poor synthesis of key factors that defines better material handling processes. Poor choices have resulted in the degradation of customer satisfaction and less competitiveness of organizations with a direct implication on survivability and viability of business operations. The study therefore focuses on interrogating factors influencing the choice of material handling system in Zimbabwe. A case study of Delta Breweries Bulawayo will be used with a specific consideration of periods from January 2020 to December 2022. The current chapter presents a clear exposition of the background to the study, statement of the problem, purpose of the study, research question, statement of the hypothesis, significance of the study, assumptions, delimitations of the study, limitations, definition of terms and chapter summary.

1.1. Background of the study

Material handling plays an important role in manufacturing and logistics, which together represent over 20% of the world economy (Groothedde, 2018). From a global perspective in USA, Canada, UK and Australia almost every item of physical commerce is transported on a conveyor or lift truck or other type of material handling equipment in manufacturing plants, warehouses, and retail stores (Groothedde, 2018). By the 1950s and 1960s an uneven transition from the old concept of material management as clerical function to a newer function or concept of material management emerged which embraced inventory control, distribution and buying function (Richards, 2019). By late 1960s material management was recognized as an important function in an organization in Australia. Thus, the importance of material management lies in the fact that any significant contribution made by the materials manager in reducing material cost will go a long way in reducing production cost and improving the profitability and the rate of return on investment (Richards, 2019).

In the United States of America Kulak (2005) asserted that Material handling task accounts for30–75% of the total cost of a product, and efficient material handling can be responsible for reducing the manufacturing system operations cost by 15–30%. These figures justify the importance of material handling cost as an element in improving the cost structure of a manufacturing organization.

In China production business material handling systems (MHS) are the livelihood of any industry, no industry can operate without them, and they are made available at the proper time, in proper quality, at the right place and at the right price (Segerstedt, 2018). In China many manufacturing organisations make use of different material handling systems in their production process. The material handling is an integral aspect of an organization (Bosch, 2020). If the materials are not managed well this would result in the organization incurring more production costs as a result of material damages and injuries.

In Canada as postulated by Neverson (2012) many manufacturing companies make use of different materials handling systems due to the type of materials they hold, availability of capital investment and the available demand from the end customers of their products. According to Tompkins (2017) he postulated that material handling (MH) is an activity that uses the right method to provide the right amount of the right material at the right place, at the right time, in the right sequence, in the right position, and at the right cost. Any material handling system is responsible for transporting materials between workstations with minimum obstruction and joins all the workstations and workshops in a manufacturing system by acting as a basic integrator.

Whitt (2013) noted that in USA the functions performed by MH equipment can be classified into four broad categories, that is, transport, positioning, unit formation, and storage. He further claimed that, all the material handling functions are composed of one or more combinations of these four primary functions. Nostrand (2012) explained that the equipment in transport category simply moves materials from one point to another, which includes conveyors, industrial trucks, cranes, and so forth and unlike transport equipment, positioning equipment is usually employed at workstations to aid machining operations. Robots, index tables, rotary tables, and so forth are the examples of this type of equipment.

In Japan and China as postulated by Beamon (2018) an efficient material handling system greatly improves the competitiveness of a product through the reduction of handling cost, enhances the

production process, increases production and system flexibility, increases efficiency of material flow, improves facility utilization, provides effective utilization of manpower, and decreases lead time. According to Tompkins, (2010) he postulated that material handling (MH) is an activity that uses the right method to provide the right amount of the right material at the right place, at the right time, in the right sequence, in the right position, and at the right cost. In South Africa at Marikana Mine material handling system is responsible for transporting materials between workstations with minimum obstruction and joins all the workstations and workshops in a manufacturing system by acting as a basic integrator.

In the Japanese and Chinese case as postulated by Beamon (2018) an efficient material handling system greatly improves the competitiveness of a product through the reduction of handling cost, enhances the production process, increases production and system flexibility, increases efficiency of material flow, improves facility utilization, provides effective utilization of manpower, and decreases lead time. According to Tompkins, (2010) he postulated that material handling (MH) is an activity that uses the right method to provide the right amount of the right material at the right place, at the right time, in the right sequence, in the right position, and at the right cost. In South Africa and at Marikana Mine to be precise, material handling system is responsible for transporting materials between workstations with minimum obstruction and joins all the workstations and workshops in a manufacturing system by acting as a basic integrator

Zimbabwean Context

In Zimbabwe, issues relating to appropriate choices of material handling surfaced amongst the challenges which the procurement discipline was facing in general. According to the report by the Procurement Board of Zimbabwe (2019), material handling choices are becoming costly to upcoming companies contributing to ultimate demise. Smith (2018) noted that a few manufacturing companies make use of the automated material handling systems due to lack of capital investment and as a result of lagging behind in technological advancement. According to Industry and Commerce report (2017) brewery companies are growingly becoming uncompetitive in terms of cost mainly due material procurement and handling processes when compared to South African counterpart. According to the report, many breweries' companies like the Delta beverages face high costs of production largely to the dependency of manual material handling systems, chief amongst the resultant problems are delays in meeting goals, human injuries and material damages.

Thus, this study was aimed at analysing factors influencing the choice of material handling system using a case of Delta Breweries Bulawayo.

1.2. Statement of the problem

The Delta Breweries Bulawayo have been experiencing an unprecedented increase in production costs. A manufacturing industry survey (2021) highlighted the recurring problem at Delta Breweries Bulawayo which also included inconsistent material supplies to their production line affected overall output by approximately 20% of production capacity. This has been attributed chiefly to its material handling systems which culminated in costs associated with delays, mechanical breakdowns, material damages and employee injuries. This study therefore seeks to unveil on the factors which have contributed to the choice of different material handling systems in the production department using a case of Delta Breweries Bulawayo.

1.3. Purpose of the study

The purpose of the study is to analyze the factors affecting the choice of material handling systems in Zimbabwe focusing on a case study of Delta Breweries Bulawayo.

1.4. Research objectives

The study was premised on the following research objectives;

i. To establish the impact of choice of material handling systems on the competiveness of Delta Breweries Bulawayo.
ii. To solicit suggestions which informs policy guidance when selecting material handling systems at companies in Zimbabwe.

1.5. Research questions

The study was premised on the following research questions;

i. What is the impact of the choice of a particular material handling system on the competiveness of Delta Breweries Bulawayo?
ii. What can you posit forward as suggestions to inform policy guidance when selecting material handling systems at companies in Zimbabwe?

1.6. Assumptions

It is assumed that there are factors which determine the choice of material handling systems used at Delta Breweries Bulawayo. It is assumed that the sample taken will be a true representative of the population under study. It is assumed that the response rate is going to be so significant that the researcher would obtain complete, accurate and relevant data and thus draw valuable conclusions.

1.7. Significance of the study

The study was significant to various stakeholders as shown below:

1.7.1. **The Government of Zimbabwe**

Brewery companies operate in submission to the requirements of various government ministries such as Ministry of Finance and Economic Development and Ministry of Commerce and Industry. Increased production quantities and quality entails competitiveness of Zimbabwean companies on the international market. This enhances foreign currency inflows into the country. Increased productivity of Delta breweries also translates to an increase in the Gross Domestic Product of the country. The contributions of the companies also stream into the collective goals of the national vision policies such as Vision 2030 of upper middle income.

1.7.2. **To Delta Breweries Bulawayo**

Brewery companies in Bulawayo Management will benefit from this study if they implement recommendations that will be given by the researcher. The recommendations provided will include the best ways to improve the available material handling systems or adoption of material handling systems which are cost effective and leads to an increase in productivity and demand. Delta Beverage Bulawayo will have in-depth knowledge on the factors which affect the choice of material handling systems. The Brewery companies will be educated on different types of material handling systems that can be used in Brewery companies from a global perspective. Additionally,

informed choices enhance organizational competitiveness and survivability of the organization as better quality and lower cost will benefit ultimate customers.

1.7.3. **Bindura University of Science Education**

The dissertation may serve as a guide to future students at Bindura University of Science Education. Copies of the study will be deposited in the university library to be used as a point of reference. The university may boast of having produced such intellectual abilities capable of providing solutions to business community in line with the philosophy of Education 5.0. This may elevate the standing of Bindura University of Science Education in the rankings of performance amongst other universities in Zimbabwe and abroad.

1.7.4. **The researcher**

The researcher would gain substantial research skills and a greater understanding on material handling systems which is a domain field of Purchasing and Supply. As a Procurement Practitioner, the researcher will significantly gain an appreciation of the various forms of material handling systems and conditions under which they are best applied. The findings of the research will be useful in the field of practice as a procurement officer.

1.7.5. **Body of knowledge**

This study will provide additional literature on the subject of material handling system which future researchers will use when carrying a related study. The methodology the researcher will adopt will be the basis of future researchers to adopt same methodologies on the subject matter and check for consistence.

1.8. Delimitation of the study

The study provided geographical, participants, literature, time, methodological and data period delimitation.

1.8.1. **Geographical delimitations**

The study was carried out focusing on Delta Breweries Bulawayo. The researcher opted for Bulawayo province because the researcher is a permanent residence in Bulawayo thus studying entities in Harare proved to be very inconveniencing and cost ineffective when collecting data. This was a possible delimitation which encourages future researchers to widen the scope to other Brewery Companies in other Provinces where the business environment and demographic environment is different from Bulawayo.

1.8.2. **Participants delimitations.**

The researcher solely considered research participants who are employees at Delta Breweries Bulawayo which is one of the brewing companies in Bulawayo Province. The researcher opted for these participants because they are the ones who purchase bulk of materials which are used in the production Industries of Opaque Beer. This was a delimitation which can foster other researchers to carry out similar research with different participants from other manufacturing companies that are not into Opaque Beer Production.

1.8.3. **Data period delimitations**

The researcher considered the data for the period extending from January 2018 to December 2022 only. This created room for other researchers to consider other periods or periods from 2017 going backwards. This period was strategic because it is the period when the new dispensation was ushered in Zimbabwe and the Corporate Governance law was crafted and the Public Procurement Act also came into law within this period as such procurement laws of materials handled by Delta Breweries Bulawayo are controlled during purchasing.

1.8.4. **Literature boundary**

The literature for this research was limited to primary and secondary data material handling system a key component in Procurement, Purchasing and Supply Management. The literature was also limited to factors which have affected the choice of material handling systems, the type of material handling systems, the challenges related to material handling in supply chain, the use of ICT and information flow in material handling system from a Global, African and Zimbabwean perspective.

1.9. Limitations

Saunders (2012) hypothesized that limitations are potential weaknesses of a study and are out of the researchers' control. Based on the view by Saunders, the researcher will be constrained by the following elements:

1.9.1. **Restriction on access to information**

The researcher encountered challenges in obtaining information pertaining to the study. The information that was required by the researcher was considered confidential and will was restricted in terms of the Official Secrecy Act of Delta Breweries. To counter this limitation, the researcher requested for a letter for authority to carry out the study from Bindura University of Science Education and forwarded it to the Brewing Management for them to give their employees permission to freely participate in the study without fear or favor. The letter was produced to respondents and rest assured them that the data collected was going to be highly confidential and used for academic purposes only.

1.9.2. **Credibility of information**

The researcher thought that the information supplied will not be authentic. By nature, other respondents would just give information to please the researcher and others will reserve pertinent information required by the researcher. In order to overcome this challenge, the researcher took time to explain to the respondents that information was required for academic purposes only. A clearance letter from Bindura University was obtained and was given to respondents as assurance that the data to be collected was strictly for academic purposes only.

1.9.3. **The political and social environment remain stable**

The researcher assumes that the political and social environment remain stable. The researcher was going to be limited if the political situation was unstable. The respondents were going to be difficult to reach for administering the questionnaires. Since 2023 Zimbabwean harmonized Elections were carried barely one month after commencement of the study and history has it that instances of political instabilities would be recorded. To counter this, the researcher advised respondents not to put on any political party regalia during the days to collect data.

1.10. Definition of key terms

Material handling- According to Coyle et al (2008) material handling is the movement and storage of material at the lowest possible cost through the use of proper method and equipment

Material handling systems-Rushton (2012) is of the opinion that it involves a wide range of tools or appliances used to transport, store, protect and control the movement of materials and product from one point to another in the manufacturing sector. For example conveyor belts, trucks, pallets, and robotic systems.

Cost-Benton (2010) asserted that cost refers to a monetary assessment of efforts, material assets, time and utility consumed, risk incurred and opportunities inevitable in the production and distribution of a product or service.

Cost reduction-it provides a cost-effective measure for industry to reduce workplace injuries and material damages before they occur.

Materials- These are components, spare parts, semi processed goods in an organization

1.11. Organization of the study

This study was arranged into five chapters. Chapter One covered the introduction, statement of the problem, research objectives, research questions, purpose of the study delimitations, limitations, definitions, and significance of the study. Chapter Two gave a presentation on the review of the literature covering the conceptual framework, theoretical framework and empirical review. Chapter Three outlined the research methodology covering the research processes, research design, approach, population and sampling techniques, research instruments used to collect data and ethical considerations for the research. Chapter Four covered data presentation, analysis, interpretation and discussion. Chapter Five presented the findings, conclusions and recommendations

1.12. Chapter summary

This introductory chapter covered the research problem and its setting. The introduction and background to the study, the statement to the problem was then provided to illustrate the inspiration of conducting the research work. The research objectives, research questions, purpose of the study as well as significance of the study were highlighted. Also in this chapter delimitations and

limitations to the study were exposed. Terms relating material handling system were defined. In the next chapter, the focus was on reviewing related literature on factors affecting the choice of material handling systems.

CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

The previous chapter clearly exposed the problem and its setting. This chapter was aimed at unveiling the literature review on the factors which determine the choice of material handling systems used at Delta Brewery Company in Bulawayo. This was important as it widens the knowledge of the researcher as information and recommendations on the factors affecting the choice of different material handling systems was gathered. Mok, Wang and Liaw (2015) posit that a literature review is a useful methodology to gain in-depth understanding of a research topic. In this chapter the researcher revealed theories referred in this study as theoretical framework and empirical studies where key theories governing the study were outlined. The conceptual framework for the study was also articulated where the key variables of the studies were outlined in a diagrammatic manner where relationships between the dependent and independent variables as well as moderating variables of the study were well articulated.

2.2 Purpose of review of related literature

Machi and McEvoy (2016) avers that the purpose of a literature review is to gain an understanding of the existing research and debates relevant to a particular topic or area of study, and to present that knowledge in the form of a written report. Conducting a literature review helps in building knowledge as postulated by Dooley (2004). The prime motive of literature review is aimed at obtaining a detailed knowledge of the topic being studied and to obtain enough general knowledge and insight to recognize the problem in the selected area. David (2010) outlines that literature review discloses appropriate theoretical structure of the study that helps to understand research problem easily.

2.1. Objective based review of literature

2.1.1. Factors affecting the choice of material handling systems

Sanchez and Perez (2011) provided several factors that affect the choice of material handling systems and these are adaptability, flexibility, load capacity, power, speed, space requirements, supervision required, ease of maintenance and cost.

(i) Adaptability

According to Eckstein, Goellner, Blome and Henke (2015) rested on the idea that materials handling operations have come out of the shadows due to the increasing pressures of digital commerce and are now directly tied to business operations. With that in mind, today's modern warehouse and stores operations are in a position to help build a competitive advantage that creates a measurable impact on the bottom-line profit maximization of a production department. The load carrying and movement characteristics of the equipment should fit the materials handling problem. Sanchez and Perez (2019) postulated that adaptability comes down to being able to stand up automated systems very quickly and also rapidly scale them up or down as demand dictates. There is clearly a physical aspect to being adaptable, be it through modular design or modular elements like mobile robotics or augmented reality. However, Eckstein, Golfer, Blome and Henke (2015) hypothesised that when systems are already up and running, it really comes down to the software that determines how nimble can be in matching order stream to available resources. While the level of investment exciting for the industry, in the near future, true success will be measured by adaptability. It is the new factor that influences the choice of material handling system.

(ii) Flexibility

It is the view of Kumar, Goyal, and Singhal (2017) that the choice of material handling systems is influenced by flexibility in operations and transportation of materials to the production industry. Where possible the equipment should have flexibility to handle more than one material, referring either to class or size. Flexibility work towards ensuring creation of the working environment needed for production and warehouse management. It creates the exact environment needed to fulfill goals on budget and the way the materials are to be handled. To achieve this, there is need for the right material handling solution. The best material handling equipment can stay flexible and dynamic adapting to the stores and warehouse environment. The flexibility means that they do not need to adjust workflow to fit the equipment.

Sanchez and Perez (2011) provided that flexibility allows smaller material handling equipment to make an impact on facility and workflow. So having specialized equipment can make material handling more effective and ergonomic. Even if operation is similar to other companies, the day-to-day tasks can vary. Having specialized equipment means that every job and task is equipped with the right equipment.

(iii) Load capacity

Sanchez and Perez (2011) hypothesised that the factors influencing choice of material handling system is loading capacity. Loading capacity entails that the eequipment selected should have great enough load-carrying characteristics to do the job effectively, yet should not be too large and result in excessive operating costs. Huku (2017) and Mvumi, Matsikira and Mutambara (2016) concurred that load capacity is a key factor which have affected the choice of material handling systems for manufacturing organisations. Equipment that deals with bulk handling aids in the control and transportation of large volumes of material either in bulk or loose form. In general, the equipment is used to move loose parts from one area of the production floor to another. Drums and hoppers can also be used to funnel loose items so they can be easily manipulated or packaged. Bulk Material Handling Systems can also utilize conveyor belts for horizontal transportation and elevators for vertical transportation.

(iv) Power

Power is one of the factors which have affected the choice of material handling systems. Enough power should be available to do the job. Maruta (2015) the common driver of the 'green-warehouse' strategy is based on the reduction of energy consumption. In warehouses with 'picker-to-part' operations the minimization of energy due to material handling activities can be achieved by means of different policies by adopting smart automatic picking systems, by adopting energy-efficient material handling equipment (MHE) as well as by identifying flexible layouts. In most cases, these strategies require investments characterized by high pay-back times. In this context, management strategies focused on the adoption of available equipment allow to increase the warehouse productivity at negligible costs. With this purpose, an optimization model is proposed in order to identify an optimal control strategy for the battery charging of a fleet of electric mobile MHE for example forklifts, allowing minimizing the economic and environmental impact of material handling activities in labor-intensive warehouses. The resulting scheduling problem is formalized as an integer programming (IP) problem aimed at minimizing the total cost, which is the sum of the penalty cost related to make span over all the material handling activities and the total electricity cost for charging batteries of MHE. Numerical experiments are used to investigate and quantify the effects of integrating the scheduling of electric loads into the scheduling of material handling operations. Click here to enter text.

(v) Other factors

Speed: Rapidity of movement of material, within the limits of the production process or plant safety, should be considered

Space requirements: The space required to install or operate materials handling equipment is an important factor in its selection.

Supervision required: As applied to equipment selection, this refers to the degree of automaticity designed into the equipment.

Ease of maintenance: Equipment selected should be easily maintained at reasonable cost.

2.2. Types of material handling systems

Material handling equipment usually falls under four main categories: bulk handling material equipment, engineered systems, storage and handling equipment and industrial trucks (Chinguwa, Nyemba, Boora and Mbohwa, 2019).

2.2.1. Bulk handling material equipment

According to Chinguwa, Nyemba, Boora and Mbohwa (2019) bulk handling material handling equipment covers equipment that transports stores and controls bulk materials. Generally, manufacturers design bulk handling material equipment to move and store materials in a loose form. Bulk material equipment includes some of the main types not limited to hoppers, recliners, conveyor belts, stackers and bucket and grain elevators. Hoppers are large funnel-shaped objects with openings that close. Companies use hoppers to pour loose materials into containers. Reclaimers are large machines designed to pick up loose materials from a company's stockpile. Conveyor belts are an essential part of a conveyor system. They use drums or pulleys to rotate their belts and move materials in bulk from one location to another. Stackers are key to bulk material handling. This automated equipment can move loose materials to stockpiles on their own and bucket and grain elevators sometimes referred to as grain legs, bucket elevators vertically move bulk materials. They'll transport these materials on a production pathway and sometimes store them.

2.2.2. **Engineered systems**

Also known as automated systems, engineered systems refer to automated bulk material handling equipment made to help transport and store materials. Usually, automated systems feature several pieces of equipment. They're very popular since they remove the need for manual labour to complete various tasks. Here are some of the primary kinds of engineered systems:

2.2.3. **Automated Storage and Retrieval Systems (AS/RS)**

An AS/RS is a very popular type of engineered system, as it can handle lots of work. It utilizes a shuttle to pick up loose materials and then place them on needed parts of the system, and the picking process can be manually operated or automated. These systems also feature racks, shelves and aisles for easy processing. They can also be connected to a company's network, making it easy for managers to monitor their stock.

2.2.4. **Automated guided vehicles (AGVs)**

AGVs are computer-operated trucks featuring sensors and detectors. These vehicles can be entirely autonomous, moving materials safely around your facility on pre-set pathways.

2.2.5. **Robotic delivery systems**

Many facilities utilize automated robotic delivery systems to transport materials. Companies typically use these systems to transport materials on an assembly line.

2.2.6. **Conveyor systems**

Conveyor systems feature several devices and mechanical assemblies that automatically transport materials throughout a facility. These conveyor systems come in multiple varieties, like apron, cleated, chain, overhead and vehicle conveyor systems.

2.2.7. **Industrial trucks**

Industrial trucks cover a wide swath of equipment, and they're all designed to assist with material transportation. These industrial trucks can range from small, hand-operated equipment to large, drivable equipment. Generally, you can break industrial trucks down into two main categories: non-stacking and stacking trucks. Non-stacking trucks are solely designed for transportation while

stacking trucks can also load materials and stack them. Some of the primary kinds of industrial trucks: Hand trucks: Hand trucks are commonly called dollies, and they're a simple piece of equipment designed to give operators the leverage they need to roll heavy materials to new locations.

2.2.8. **Side loaders:**

Manufacturers craft side loaders to fit between narrow aisles, easily picking up items on either side of them.

2.2.9. **Pallet trucks:**

Otherwise known as forklifts, pallet trucks are machines operators can use to lift heavy pallets. They feature forks designed to slip under the pallet, lift it up and then secure it as the operator takes it to a new location. You can find manual and electrical forklifts in various warehouses around the country.

2.2.10. **Order pickers:**

When operators need to access materials stored up high, they use order pickers. These machines safely lift operators, allowing them to access hard-to-reach materials.

2.3. The effectiveness of material handling systems

There are several factors that influences the effectiveness of material handling systems and these are speed of delivery, availability of floor space, flexibility, number of machines and number of operations. Pramod and Banwet (2010) advocated that proper supply and transport results into cost minimization along with the maximization of speed delivery influences the effectiveness of material handling systems. Material handling equipment's used to accomplish the work should be flexible enough to deal the different shape and size parts. Flexibility in material handling condenses labour cost, lead time and safeguards good quality (Eade, 1989).

Enhancement of vehicle capacity reduces the average throughput time along with the production output rate augmentation (Van der Meer, 2000). The prime objective of material movement route is to reduce quantity of vehicles and minimization of overall vehicle travel time (Akturk and Yilmaz, 1996). Automation has become a major need for the material handling system in logistics

system. Proper distribution management leads to enhancement of efficiency, profitability and low cost (Barbera et al., 2005).

Space requirement has a significant position in the automated M.H equipments selection. Plant layout should be planned with an aim to reduce the material handling cost, time and capitalize production rate flexibility (Malakooti and D'Souza, 1987). Ozden (1988) recommended different approaches in order to reduce the production sequence time and proper arrangement of multiple-load carrier functions. Muller, (1983) stated that overall expenditure of material handling may reduce by implementing right execution of different techniques and strategies such as enhancement in product lifespan, reduction of manufacturing time, working area, equipment utilization and minimization of capital expenditures.

2.4. Theoretical Framework

This section highlighted the theoretical substance used to provide the foundations of the study, and serve as a framework for dipper understanding of the study. The study was guided by three material handling systems theories namely the Ideal System Approach as postulated by Tompkins (1996), the Material Handling System Design by Hassan (2010) and The Transactional Cost by Groover (2010).

2.4.1. **Ideal System Approach by Tompkins et al. (1996)**

The Ideal System Approach by Tompkins et al. (1996) postulated that there are three different perspectives of the ideal Material Handling System namely theoretical, ultimate and technologically workable. Gourdin (2011) opined that the theoretical ideal material handling system is a perfect system with zero cost, quality defects, safety hazards, wasted space and no management inefficiency. On the other hand, an ultimate ideal system is probably achievable at some point in future, but Tompkins et al. (1996) marked that lack of available technology as the reason that the system is not achievable at the present time.

Drum (2009) pointed out that the technologically workable ideal system is a system that the required technology is available; however, some factors such as cost might be an obstacle in the way of installing some components. In the end, Tomkins et al. (1996) recommended companies to implement a cost-effective system that is able to work at the present time without any obstacle for

its successful implementation. Therefore, guided objectives 1 and 2 as outlined above on the research objectives.

Figure 2.1. Ideal System Approach Tompkins (1996)

The ideal system Approach

- Ultimate System
- Technology Workable Ideal System
- Recommended System
- Present System

Source: Secondary Data [Tompkins, 1996]

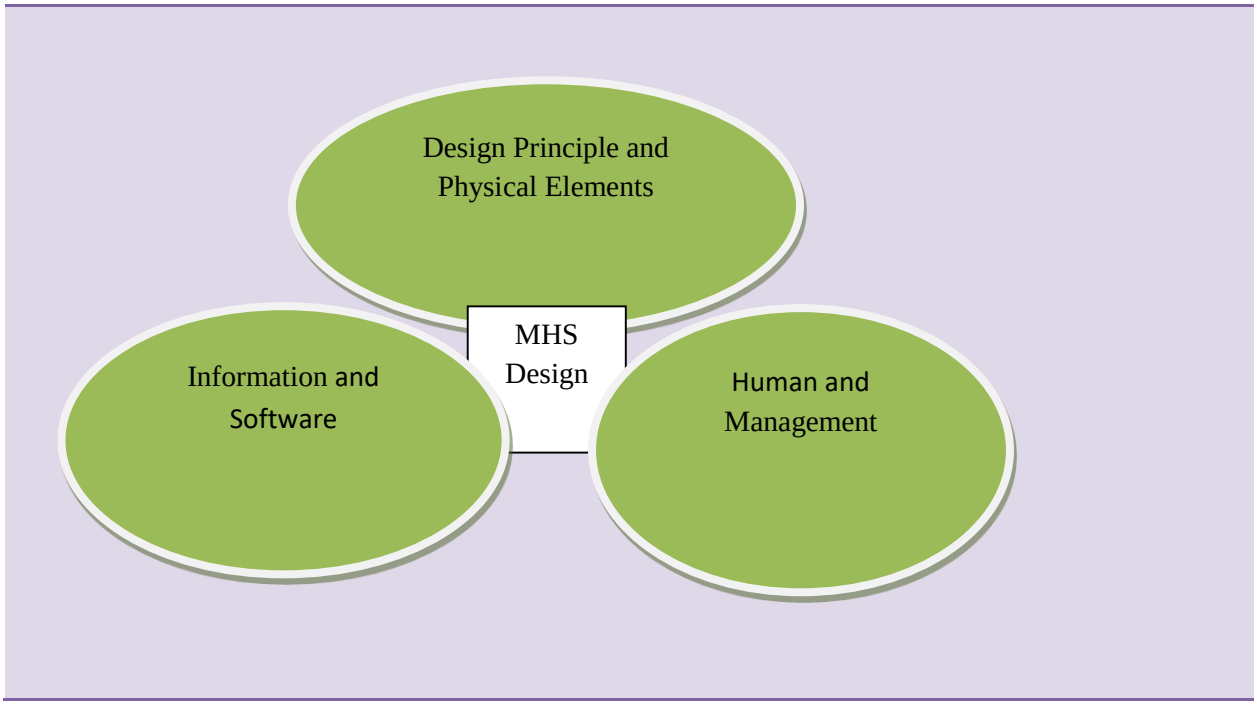
2.4.2. **Material handling system design approach (hassan, 2010)**

Hassan (2010) proposed a framework that names the steps that have to be considered when Material handling system is taking place. MHS design procedure is a difficult problem that should be decomposed into smaller sub-systems. According to Hassan (2010), MHS consists of hardware, software, human and management sub-systems that work mutually to perform all activities related to material handling. Hardware being the largest sub-system includes several physical elements such as equipment for transfer, storage and identification. Software ensures the communication link between hardware elements and also the material handling system with its environment. Finally, human and management sub- system addresses operations of MHS, and aims to function it efficiently regarding company's manufacturing strategies.

After decomposing the problem into smaller steps, objectives of the MHS should be specified according to requirements and conditions of the overall system that MHS will operate under, and characteristics and inputs of its environment. Environment and its elements of the MHS, which it will operate in, should be identified in earlier phases of design, since it interacts, provides and affects the MHS. Elements of external environment include suppliers, customers, regulations (e.g. safety constraints) where on the other hand, internal environment consist characteristics of the facility such as physical layout, type of production, type of industry and facility (Hassan,

2010).This theory will guide objective 3 and 4 respectively as outlined in the research objectives above.

Figure 2.2: Material Handling System Design by Hassan (2010)



Source: Secondary data [Hassan, 2010]

2.4.3. **Transactional cost economics theory (groover, 2010)**

This theory states that when a transaction is carried out a number of costs arise in the economic system, (Groover 2010). When there is need to purchase equipment transaction theorists alludes that the organizations are faced with two types of costs namely the transaction costs and the production costs. Gourdin (2011) asserted that transaction costs refers to costs of all information processing necessary to coordinate the work of people that perform the primary procedure whereas production costs are associated with the physical process essential to create and allocate the goods or services being produced.

Excessive costs may result in the organisation failing to procure the required technologically advanced equipment hence resulting in the use of manual material handling systems, (Groover 2010). There are high transactional costs associated with mechanical failure and the purchase of new equipment hence the organizations have to resort to collaborative relationships with suppliers

so as to get discounts, guarantees and after sale services such as equipment maintenance, (Van Weele, 2010). This theory will guide objective 4 and 5 as outlined in the objectives above.

2.5. Empirical evidence

This refers to the studies in the past which are identical to the present study. The empirical evidence does not only show the summary of the previous studies but also establish the knowledge gap which might be in terms of different approaches or theoretical start point. In the current study various pertinent studies were considered for literature reviewed.

Kulak (2015) conducted a study in Australia entitled ***'Factors influencing selection of material handling in Australia'.*** The study was aimed at establishing key issues affecting handling options in the manufacturing industry in Australia so as to improve its standing on the international market. The study adopted a mixed approach. The study was conducted on 200 respondents in Australia. The study concluded that effective use of labor, providing system flexibility, increasing productivity, decreasing lead times and costs are some of the most important factors influencing selection of material handling systems. He also asserted that determination of a material handling system involves both the selection of suitable material handling equipment and the assignment of material handling operations to each individual piece of equipment. The researcher adopted the use of a case study approach and data was collected with the use of interviews, observations and measurements.

His findings were also similar to the research conducted by Sujono and Lashkari, (2016) in India targeting manufacturing industries in Chennai that concluded that material handling system selection is guided by aspects of selecting material handling equipment to perform material handling operations within a working area considering all aspects of the products to be handled. However, the research was limited to the extent that it was conducted in India and Australia in 2015, yet the current study is being conducted in Zimbabwe in a Brewering Company in 2023 where the business environment is different.

Another empirical study research by Asef-Vaziri and Laporte in 2019. The study was conducted in Bosch Rexroth in Japan and titles ***'The impact of material handling on the production process in the Automobile industry'.*** The research was premised on a sample of 205 respondents. The research made use of the descriptive research design and questionnaires and interviews were used

to collect the data. The response rate of 92% from the research instruments used was used to conclude that a proportion of manufacturing expenses can be attributed to material handling and the most critical material handling decisions in this area are the arrangement and design of material flow patterns. This idea was shared by Ioannou (2017), who argues that an important aspect of any production system is the design of a material handling system (MHS) which integrates the production operations.

The research is different from the current study as it was conducted in the automotive industry in a developed country (Japan) whereas the current research is focusing on a Brewing company in a developing country.

Jariwala Siddharth and Jayeshkumar Pitroda (2018) carried out a study in India pertaining material handling systems. The study was titled ***'The factors affecting the choice of material handling systems in the construction industry'.*** The study adopted a mixed approach. The study was conducted on 200 respondents in India construction industry. They postulated that procuring with cash, financing through a loan, renting and leasing were regarded as the most common ways which are mainly affected by different construction material handling system selection factors. For having the best result in profit for a construction industry choosing the best alternative for obtaining equipment is one of the most important issues. It concluded that the optimum acquisition strategy comes from accurate estimates of revenues and cost and also some non- financial factors that effect on selection of appropriate material handling systems.

In the SADC region, Castenholz (2003) conducted a research in South Africa. The study was titled ***'Determinants of choosing material handling systems in South African manufacturing industries'*** The study was based on a population of 300 firms. The researcher made use of a case study for feasibility purposes. The size of the sample size used was 180 respondents in the Graigstone Manufacturing Company. The researcher made use of both primary data which was in form of questionnaires and secondary data which was obtained from the firms' statistics. He concluded that for cost reduction several factors such as product type distance between stations, delivery frequency and quantity, and storage locations are prominent factors that the firms considered when choosing the material handling systems. The study revealed that factors such as product type, distance between stations, delivery frequency affect the choice of material handling systems however, this study was conducted in manufacturing sectors in South Africa of which

most of them makes use of automation material handling systems as the country is technologically advanced as compared to the country understudy of which most manufacturing sectors struggles to make use of mechanized equipment and automated material handling systems due to lack of capital to procure more technologically advanced equipment.

In East Africa, Chiwoon Cho (2018) conducted a study in Nigeria. The study was titled, ***'The design of a web-based integrated material handling system for manufacturing applications'***. The study adopted a quantitative approach. Data was collected from the textile manufacturing industry. He used cluster sampling and data was collected with the use of questionnaires which were distributed to 40 respondents. The research found out that vital factors contributing to the selection of material handling system to use are constraints imposed by the structural environment of the facility, the combination and characteristics of the materials to be handled, and the uncertainty in the operational environment. In his research, he also concluded that both technical and non-technical factors are to be taken into account when making a choice of material handling system to make use of. He further found out that in order for the material handling system to be useful in practice, material handling system must consider not only quantifiable factors such as cost and aisle space but also technical and strategic factors such as the environmental condition of the facility, the nature of the operations, and the expected production trend.

Labar (2005) studied in Morroco. The study was titled, ***'Material handling system in heavy manufacturing plants in Morroco'*** The manufacturing plants were experiencing tremendous product damages which were bringing in huge compensation costs to the companies. These issues arise basically from employee actions in different material handling operations and incompatible material handling equipment. The study adopted a quantitative approach and used a sample of 230. An econometric model was used to assess the effects of material handling system on employee safety. Ordinary least squares were used as an estimation method to estimate the model. SPSS version 16.0 was used to analyze the data. He concluded that it is important that safety and ergonomics related issues should be taken into account in designing phase of material handling system and further asserted that in addition, it is strongly recommended that a MHS should be simple and formed for more safety, efficiency, and productivity. The study made use of quantitative research methods whilst the current study is making use of the qualitative research techniques and data will be presented in form of statistical tables, pie charts and bar graphs.

Moreover, Basch 2010) points out that in many cases the actual cost of material handling is buried under labour costs. However, for cost reduction several factors such as product type distance between stations, delivery frequency and quantity, and storage locations are prominent (Basch, 2010). These factors will not only result in elimination of direct labour, but also will increase the productive time for other employees. Furthermore, by using a pre- defined and well-equipped travelling path the total driving distance will be decreased, and many accidents and unnecessary activities can be avoided (Basch 2010). However, this study is different from the current study as it was conducted in Morroco in an oil company whereas the current study is focusing on the factors affecting the choice of material handling systems in Zimbabwe.

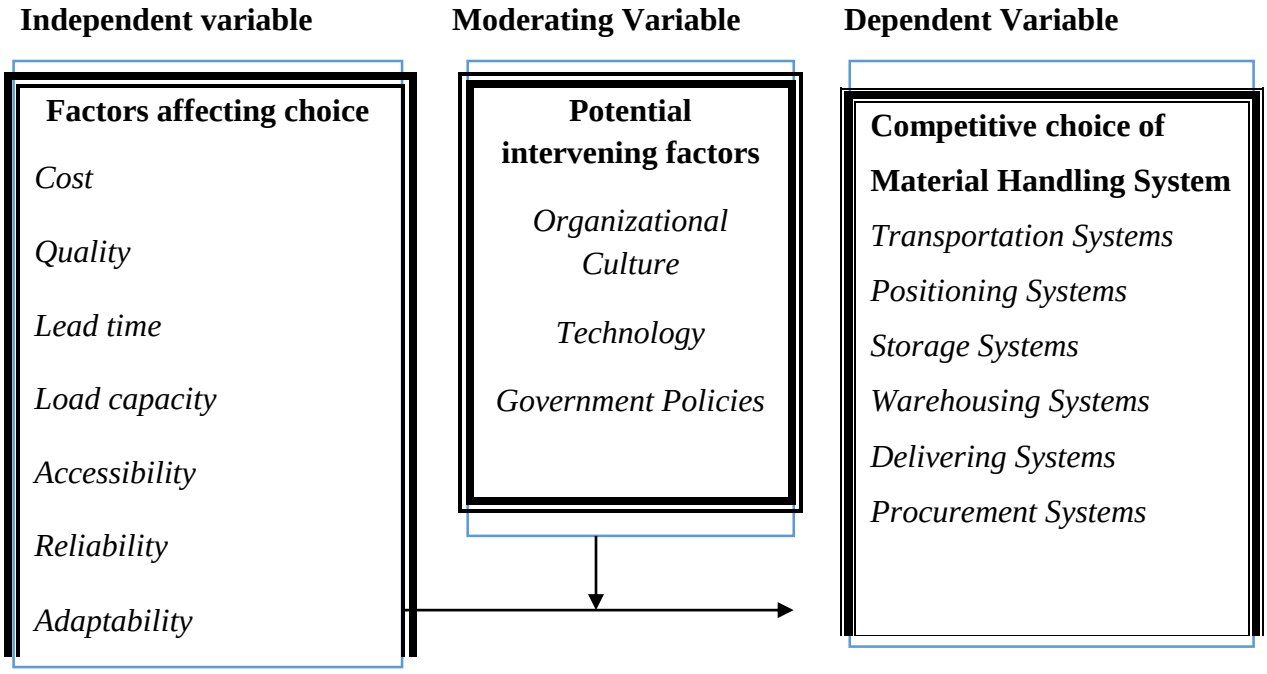
2.6. Research gap

In the above framework, the researcher elaborates that Material Handling System includes and manifest as Transportation Systems, Positioning Systems, Storage Systems, Warehousing Systems, Delivering Systems and Procurement Systems. The previous researches explored the applicability of these handing systems in the context of economies in other economic blocks which vary in character and size with the Zimbabwean economy. The national vision 2030 pursuance is a different economic benchmark all together and particularize the context of the Zimbabwean Economy as it operates in the SADC economic block with different factors of consideration. By and large, the factors which influence the selection of material handling system in Zimbabwe remains underexplored thereby necessitating the need for the current study.

2.7. Conceptual framework

A conceptual framework is an analytical tool with several variations and contexts. It can be applied in different categories of work where an overall picture is needed. It is used to make conceptual distinctions and organize ideas (Mugenda and Mugenda, 2013). In this study it was planned to assess the factors affecting material handling system. The conceptual framework was revealed objective by objectives.

Figure 2.3: Conceptual framework for the study



Source: Researcher's conceptual framework

In the above framework, the researcher elaborates that Material Handling System includes and manifest as Transportation Systems, Positioning Systems, Storage Systems, Warehousing Systems, Delivering Systems and Procurement Systems. This may be enhanced through various techniques such as the use of artificial intelligence, training, electronic measures, and culture of the organization.

2.8. Chapter summary

In the above framework, the researcher elaborates that Material Handling System includes and manifest as Transportation Systems, Positioning Systems, Storage Systems, Warehousing Systems, Delivering Systems and Procurement Systems. This may be enhanced through various techniques such as the use of artificial intelligence, training, electronic measures, and culture of the organisation. The next chapter focus on the methodological aspects of the study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0. Introduction

The previous chapter focused on literature review that is linked to the factors which determine the choice of material handling systems. This chapter articulated the research methodology used by the researcher which takes into account the research philosophy, research design, research approach, population and sample size, the sampling procedures and the research instruments and the methods used in the collection of data. It also looked into consideration the validity and reliability of the research instruments which were used as well as the procedures for data collection, analysis and presentation and the chapter concluded with a summary at the end.

3.1. Research philosophy for the study

Research philosophy guides the researcher as to which research philosophy and research paradigms, to follow. The Research Onion by Saunders, Lewis and Thornhill (2007), provides an effective progression through which this research followed. According to Bryman (2012), the usefulness of the research onion lies in its adaptability for almost any type of research process and can be used in a variety of contexts. There are several paradigms to research philosophy which are positivism, interpretivism, pragmatism, realism and critical realism (Bryman, 2012).

This research was based on pragmatism philosophy as the researcher sought to ascertain causal relationships in the choice of material handling system used in brewery industries in Bulawayo using both quantitative and qualitative methods. Pragmatism means thinking of or dealing with problems in a practical way rather than by using theory or abstract principles. Pragmatism allows the researcher to adopt both quantitative and qualitative research in order to gain a deeper understanding of the issue which is being assessed (Bryman and Bell, 2011). For example in this study, the researcher wanted to know the factors influencing the choice of material handling system. Pragmatism involves the collection and analysis of both quantitative and qualitative data, and integrating the two sets of results to draw inferences from the quantitative and qualitative results (Rowley, 2012). Therefore to combine both was very critical in this research in order to get reliable and true information from respondents.

3.2. Research approach

There is several research approaches used in academic research writings among them are qualitative, quantitative and mixed (Saunders, 2012). This research adopted a mixed research approach. Justification of using this approach is that the problem being solved requires minimal inferential statistical manipulations or procedure, but rather the findings that can only be measured qualitatively (Cresswell, 2009). The mixed research approach was used to determine reality on the problem being studied, that of factors influencing the choice of material handling systems. The mixed research approach was seen as appropriate because quality constructions have a natural setting, use interactive and humanistic method and quality missing links are fundamentally interpretive. The mixed research approach was preferred because the actual findings of the study are beyond anticipation of the researcher.

3.3. Research design

There are a lot of research designs applied in research not limited to explanatory, exploratory, descriptive, survey designs and predictive research designs. The choice of the design is determined by the research philosophy and research approach whether the research is qualitative, quantitative or mixed. Since my research is a mixed type of research the descriptive survey research design was considered appropriate.

3.3.1. Descriptive survey

According to Quinlan et al (2015) a descriptive survey is a social science research method which makes use of questionnaires and interviews in order to obtain data. On the other hand a survey as defined by Saunders, Lewis and Thornhill (2016) refers to soliciting equivalent information from an identified population. Surveys can be conducted in two forms namely written through questionnaires and orally through interviews. In this study both questionnaires and interviews were used.

Wagner et al (2012), postulate that surveys are excellent means of measuring attitudes and orientations. The research design is considered relevant in this study because of its strength and capacity in measuring attitudes and constraints prevalent. The survey design enables the researcher to collect information through asking participants about their experience, attitudes and knowledge

so as to capture in-depth information about factors influencing the choice of material handling systems at Delta Breweries in Bulawayo.

The method enables precise comparisons of answers by respondents through standardisation of questions put across to them. The standardised questions provide the researcher with the strength of measurement. The survey method is found to be simple in application and very high on reliability on questionnaires. A survey method is cost effective as information can be obtained well in time and without much cost whilst covering a larger geographical area. Surveys are particularly appropriate for describing the characteristics of large populations thereby making large samples feasible, hence suitable for this study.

More so, the researcher sought to use descriptive survey design because it is cheap to use and the researcher has no sufficient monetary and material resources to carry out an in-depth investigation that requires more resources since she exclusively depends on salary he gets from his employment. However, research design is difficult to know people's attitudes and experiences where questionnaires will be used. To counter this, interviews were used to enable the researcher to note the attitudes and behaviors of the respondents. The validity of data to be collected by questionnaires may be low as some questionnaires may be completed by the respondents who are not intended, however to counter this the researcher wrote instructions on each questionnaire.

3.4. Population of the study

Zimkund et al (2010), define the population as any complete group of entities that share some common set of characteristics. According to Quinlan et al (2015) a population is a complete group of entities that share some common set of characteristics. Chimedza (2003) postulated that there are two types of population namely the target population and study population. Target population refers to the subject to whom the results can be generalized to the population whereas study population is a small representative group of the whole population under study. In this study the target population is 123 employees employed by Delta Breweries in Bulawayo.

3.4.1. Sampling Procedures and sample size

Hair et al (2008) identifies two types of sampling designs or techniques which are probability and non - probability sampling. In this study, the researcher used stratified sampling which falls under the probability sampling techniques to pick participants for this research. Participants were put

into three strata's senior management, middle management and non-managerial staff. There were 3 senior managers, 20 middle managers and 100 non managerial employees. According to Saunders et al (2016), stratified sampling entails subdividing the population into smaller groups or strata with homogenous characteristics and then simple random sampling is carried out from each stratum. In this study the population were put into strata depending on position in the company whether management level or non-managerial. This sampling technique was chosen to ensure that every member who forms part of the population has an equal chance of being selected into the sample. This is premised on the understanding that a simple random sampling procedure ensures that each element in the population has to have an equal chance of being included in the sample (Leedy, 2010).

To ensure that each of the participants who formed part of the population in the sampling frame stood an equal chance of being included in the sample, the researcher wrote down 123 pieces of papers inscribed 'Yes' and No guided by the sample size. The papers were then placed in a plastic bowl, shacked together before participants of the sampling frame will be picked from the papers one after the other without replacement so that each participant had an equal chance of being picked. Those who picked on papers inscribed 'Yes' become the sample units and those who picked NO were excluded from the sample size.

Krejcie and Morgan (1970) created a convenient table which guide in the construction of an appropriate sample size. This was necessitated by the need for a representative statistical sample in empirical research which created the demand for an effective method of determining sample size. To address the existing gap, Krejcie & Morgan (1970) came up with a table for determining sample size for a given population for easy reference. The researcher cross matched the population figures with values prescribed in the pre-calculated table by Krejce and Morgan (1970).

Table 3.1: Sampling Frame

Stratum	Number of respondents	Sample Size
Senior Managers	03	03
Middle Managers	20	19
Non Managerial	100	80
Total	**123**	**101**

Source: Delta breweries Bulawayo human resources records (2023)

The sample size was constructed using the Krejcie and Morgan Table (1970) with information from the Delta Beverages Bulawayo Human Resources Database and comprised of 03 Senior Managers, 19 middle managers and 80 non managerial staff. The sample size was influenced by many factors such as the objectives of the study, availability of resources such as time, money, personnel among others. Hence, 101 employees were used under this study.

3.5. Data collection procedures

Saunders et al (2016) defines data collection procedure as a systematic way of extracting information from the research data sources. In this study the researcher used questionnaires and interviews.

3.5.1. Collecting data using a questionnaire

The researcher used questionnaires to collect data from the respondents. Questionnaires were distributed to first line managers and returned to the researcher for analysis. A questionnaire is a common instrument for observing data beyond the physical reach of the observer (Wyse, 2012). It is a formalised schedule which contains an assembly of carefully formulated questions for gathering information and it is effective when it is designed to suit research aims and also to elicit cooperation from the respondents. Ganguil (2013) noted that questionnaires are designed using dichotomous (yes/no) type of answers and Likert scale, be it 5 point Likert scale or 7 point Likert scale. Ganguil (2013) further noted that questionnaires might be designed as open ended questions or closed ended questions where the respondents can pen their answers without guidance.

3.5.1.1 Nature of questions

In this study, the researcher used both closed and open-ended questionnaires because of their flexibility in allowing respondents to respond on their own time. Saunders et al (2016), aver that open-ended questions allow the subjects to write or answer in any way they want. Open-ended questions gave the respondents the latitude to express themselves thereby capturing all the views. The researcher used the questionnaire because questionnaires are easy to administer as compared to other research instruments and they also have wide geographical coverage. Questionnaires gather large amounts of information from a large number of people in a short period and in a relative cost-effective way. Since the time frame of research was limited but accurate results are

required, questionnaires covered up by collecting some of the required information at a small-time frame given.

Saunders et al (ibid) state that closed questions give the respondents the opportunity to choose between predetermined responses. They allow certain responses, as in multiple choices, true or false and yes or no questions. Closed form, often called structured or closed ended questions will be the best in obtaining demographic information and data that can be categorized easily. Closed questions were answered faster, than open-ended questions.

3.5.1.2 Testing of the questionnaires

The questionnaires were pre-tested to a group of 20 employees of Delta Breweries Bulawayo who were not part of the sample size for the study. All ambiguous questions were rephrased so that they became more specific. Time taken to complete the questionnaires was also noted and the questionnaires were adjusted in a bid to make them convenient to the respondents in terms of time taken for completing.

3.5.1.3 Administration of the questionnaires

The researcher personally distributed the questionnaires to the respondents. Assistance was obtained from five close friends who are my classmates at BUSE to distribute the questionnaires. One day training on the administration of questionnaires was done by the researcher with my friends

3.5.1.4 Justification for the use of questionnaire

The researcher found the use of questionnaires advantageous in that they were impersonal and anonymous. The respondents felt free to complete them and expressed their views without fear of being known or victimized. The use of questionnaires was cost effective to the researcher in terms of time, money and travelling considering that this research was done within limited time. More so, the researcher managed to administer them across different employee levels Delta Breweries Bulawayo.

3.5.1.5 Disadvantages of the questionnaires

There were some difficulties that were encountered through the use of questionnaires. There was no control over who completed the questionnaires and as such the intended respondents might not have been the ones who completed the questionnaires. However, the appreciation of these setbacks emanating from the use of questionnaires assisted the researcher to navigate his way round and proceed cautiously. Anonymity was guaranteed by asking respondents not to include their names and the importance of each response was emphasized. The researcher also guarded against the demerits of the questionnaire by issuing a covering note together with the questionnaire explaining the importance of the study and requesting the truthfulness, integrity and honesty of the respondents.

3.5.2. **Interviews**

Interviews were also used to get to the depth of the problem. The researcher used interviews as a way to obtain information. Gilbert (1993) defines interviews as sessions in which pre-association and hidden sources of feelings are discussed generally through a very close, unstructured question guide administered by a skilled interviewer. Semi-structured interviews were used by the researcher. Semi-structured interviews are informal and were used to explore a general area of the research with an in-depth probing and further questioning for clarification which enhanced the researcher to getting much information which interviewees might not have divulged. The researcher probed the senior management at Delta Breweries Bulawayo about the factors influencing their choice of material handling system in addition to the answers obtained from a questionnaire as much information was gathered. In this case the interview was the best tool because it was able to collect data from senior employees at Delta Breweries Bulawayo who are always busy with their schedule to have time to complete a questionnaire.

3.6. Data collection procedures

The data was collected after authority to do so was granted from management of Delta Breweries Bulawayo and BUSE University administration. Letters to seek authority to collect data were obtained from the university through the supervisor for dispatch to the relevant authorities. Since production and manufacturing organization strictly adheres to authority seeking culture prior to its supply of any information pertaining to either its structures or operations, the authority to collect data pertaining the activities was sought from the top management prior to dispatch of data collection instruments to the respondents. Questionnaires were then distributed to the respondents

personally by the researcher as a way of ensuring confidence of the respondents that their information would be strictly between the researcher and themselves. After a period of three weeks the questionnaires were collected personally by the researcher.

3.7. Data analysis

According to Zikmundetal (2010), data analysis involves the application of reasoning to understand the data that have been gathered. He further asserted that analysis also involves the determination of consistent patterns and summarizing the relevant details reviewed in the investigation. In this study data will be analyzed quantitatively and qualitatively.

3.7.1. Quantitative data analysis

For quantitative data analysis the researcher coded the collected data and categorize it question by question. The quantitative data was therefore fed into the statistical analysis (Statistical Packages for Social Sciences –SPSS Version 23) for generation of graphs, tables and themes. Answers to open ended questions were transformed into meaningful information. Data was finally tabulated and interpreted.

3.7.2. Qualitative data analysis

Data that was collected presented through thematic analysis based on research objectives and emerging themes. The data was presented in verbatim were the respondents were coded E1 to E6 so as maintain confidentiality of the respondents so that no one was known by names.

3.8. Ethical considerations

Wyse (2012) defines ethics as moral principles that govern a person's behavior or the conducting of an activity. The researcher took all necessary measures to ensure that respondents did not suffer any prejudice as a result of the study.

3.8.1. Security and confidentiality of respondents.

The researcher ensured that all the participants were safe from physical harm, discomfort, pain, embarrassment, or loss of privacy by keeping their responds private and confidential. The participants were advised not to write their names or work numbers on their questionnaires to avoid victimization in case the questionnaire falls in wrong hands. The researcher ensured that

information collected remained confidential by collecting the questionnaires and doing the interviews personally as well as keeping the completed questionnaires and interview responds under lock and key.

3.8.2. **Informed consent.**

The researcher acquired informed consent from the University as proof that the study is strictly for academic purposes only. Aims and objectives of the research was explained to participants before the study was conducted.

3.9. Reliability and validity

Validity refers to how well a test measures what it is supposed to measure (Wyse, 2012). A careful attention to validity issues ensures that the research produces accurate results and solves the identified problem. The researcher designed the questionnaire using the research questions which were formulated on the bases of the research objectives. This was to ensure that the responses from the field research would answer research questions formulated to address the research problems. In addition, a pilot test was conducted on a limited number of respondents to ascertain whether the research instrument will gather relevant data for the study.

Reliability is the degree to which an assessment tool produces stable and consistent results (Wyse, 2012). There are three types of consistency which include internal consistency, test-retest reliability and inter-rater reliability (Wyse, 2012). All respondents were given the same questionnaire so as to improve reliability of the research and their responses were consistent (internal consistency). The questionnaire was tested using SPSS version 21 using Cronbach Alpha and Ganguil (2013) noted that if the Cronbach Alpha is more than 0.6 it means that the questionnaire is reliable. The questionnaire was tested and it was 0.675 implying that that the instrument was reliable.

3.10. Chapter summary

The chapter covered the methodology for the study covering the research philosophy, research approach, research design, population of the study, sampling techniques, sample size, selection of the research instrument, validity and reliability of the data and ethical considerations observed when carrying out the study.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS, INTERPRETATION AND DISCUSSION OF FINDINGS

4.0. Introduction

The previous chapter clearly articulated critical aspects of methodology pertaining to the study. The current chapter presents outcomes from the primary data from the respondents. The data was designed to address the demands of the objectives. Interviews and questionnaires are the instruments used in the collection of primary data. The data was solicited to answer the research objectives of this study. The study focused on interrogating factors influencing the choice of material handling system in Zimbabwe. A case study of Delta Breweries Bulawayo was used with a specific consideration of periods from January 2020 to December 2022. Data was presented both in tabular and graphical manner as well as textual for qualitative data from interviews. Points of linkages and controversies were established during the discussion. A summary was provided at the end of the chapter.

4.1. Data presentation, analysis and interpretation.

This section furnishes with the presentation, analysis and interpretation of data collected from the field. Semi-structured questionnaires and interviews were used to collect the data. Qualitative and quantitative data were presented and interpreted separately. The triangulation perspective of using both approaches ensured that the inherent weaknesses found in one approach were covered for by the usage of the other approach.

4.1.1. Response rate

A total of 99 questionnaires were distributed to respondents according to category. The results are as tabulated below.

Table 4.1: Response rate.

Description	**Administered**	**Received**	**Valid**	**Valid Response Rate [%]**
Middle managers	19	19	19	100%
Non managerial staff	80	80	80	100%
Total	**99**	**99**	**99**	**100%**

Table 4.1 above clearly reflect a high response rate. All the categories of respondents' stratum received a 100% response rate. This explicates sufficiency of respondents' threshold and credibility of the outcomes as a true representative of the views, perceptions and experiences of the target population. The response rate remains in sync with recommendations by Trochin (2019) who suggested that response rates within the range 75% are deemed favorable and credible.

4.1.2. **Demographic variables of the respondents.**

4.1.2.1 Gender

The consideration of gender variable serves to illustrate the inclusiveness of the study on perceptions which are inherently gender based. The results reflect a fairly representative sample with gender parity. Under the category of Senior Managers there was a 2 (67%) proportion of male and a 1 (33%) proportion of female. Under the category of middle managers there was a 9 (47.37%) proportion of female respondents and a 10 (53.63%) proportion of male respondents. Under the category of non managerial staff there was a 50 (62.5%) proportion of male respondents and a 30 (37.5%) proportion of female respondents. The gender variable is indicated in the various categories below.

[N=102]

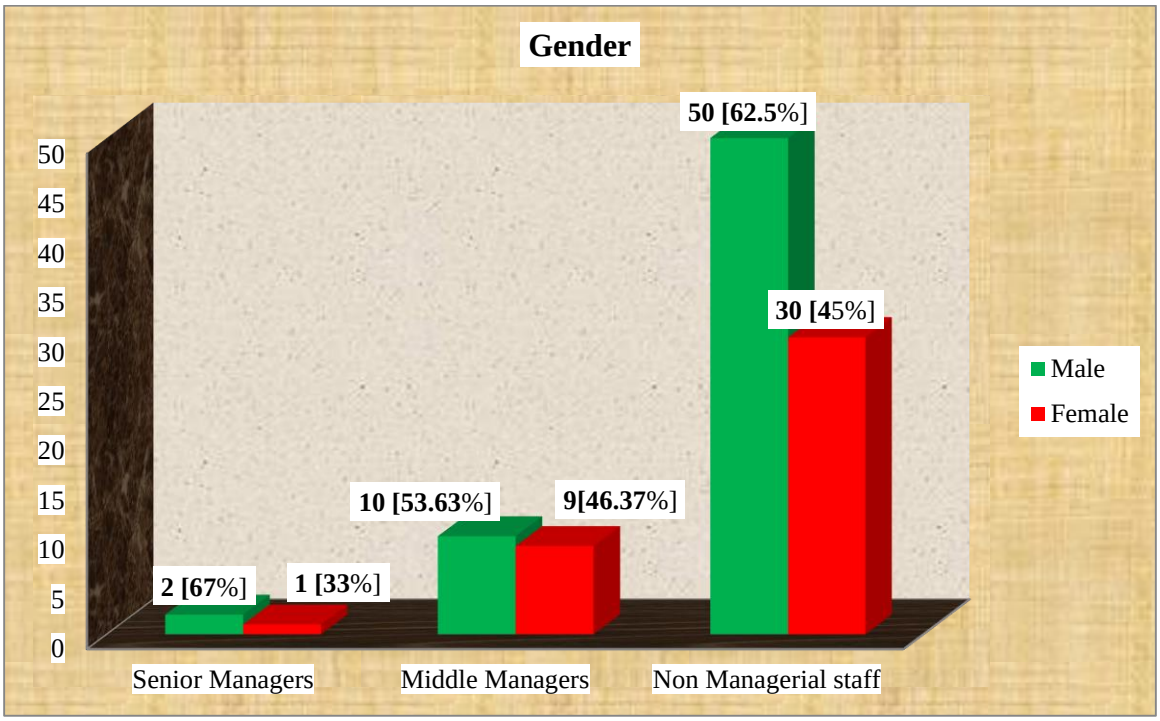


Figure 4.1: Gender distribution across respondents' categories.

The component of gender is fairly balanced in the study. This facilitated representativeness of all participating gender components. It ultimately adds to the quality of data that is being presented in the study as well as credence in the perspectives of stakeholders to the research.

4.1.2.2 Age

Age of respondents demonstrates breath of exposure and understanding of social issues. The responses indicate that the respondents in the category of Senior managers fall in the age range of 46 years and above and make up 100%. The age range of middle managers is represented as 4 (21.05%) in the class below 30 years, 8 (42.11%) in the class between 31 - 45 years and 7 (36.84%) fall in the age class of 46 years and above. Under the category of non managerial staff, 40 (50%) fall under the class below 30 years, 30 (37.5%) in the class between 31 - 45 years and 10 (12.50%) fall in the age class of 46 years and above. A glance at the statistics shows that the majority of the respondents are clustered in the range between 31 and 45 years. The least constituted category in

the class of 46 years and above. The age distribution is suggesting that the balanced age groups present balanced views and experience.

[N=102]

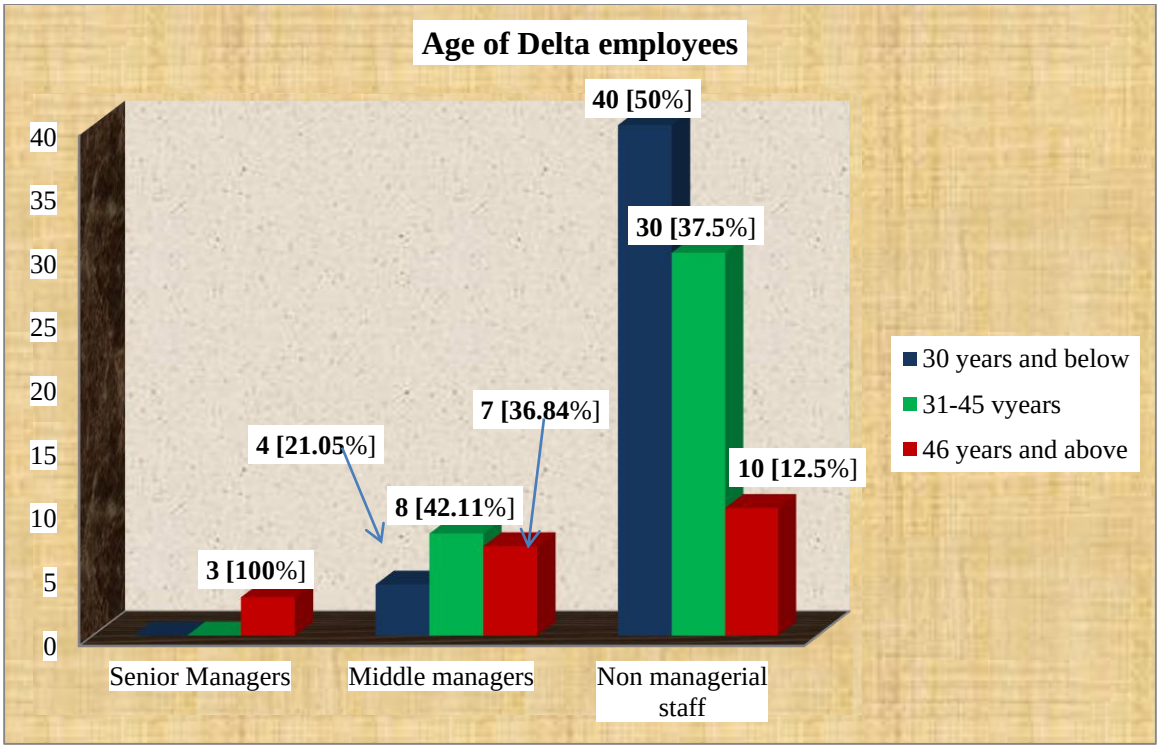


Figure 4.2: Age of respondents across categories.

A closer scrutiny at the age grouping reflects a balanced and representative proportions at all levels. The balance adds to the quality of data being solicited as it represents views from all pertinent age groups.

4.1.2.3 Duration in the service.

Experience is inherent with length of service and exposure. Therefore, to solicit clues on the breadth of experience of the respondents, duration of service was indicated in various categories. Under the category of Senior managers, 3 (100%) fall in the class of those who have served 6 years and above only. Under the category of middle managers 4 (21.05%) fall under the class of those who served below 2 years, 6 (31.58%) served between 2 and 5 years whilst the remaining proportion of 9 (47.36 %) served for 6 years and above. In the category of non- managerial workers, 10 (12.5%) served for a period below 2 years, 30 (37.5%) served for a period between 2

and 5 years and the remaining 40 (50%) served for a period of 6 years and above. The duration of service responses are as indicated in the respective categories below.

[N=102]

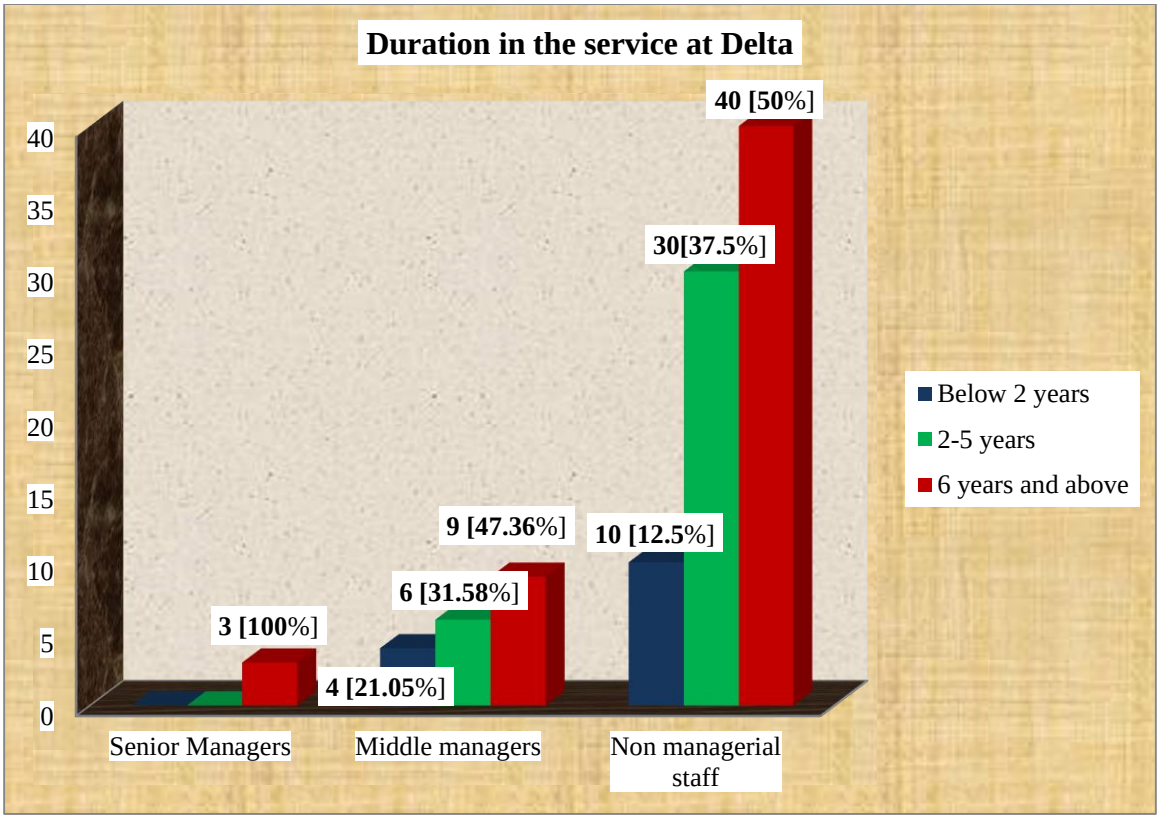


Figure 4.3: Duration in the service.

The length of service is a clear pointer to the breath of understanding of issues relating to material handling in the organisation. Most of the respondents, as evidenced in the statistical presentations, are in the category of 6 years and above. This shows that they have acquired sufficient threshold of experience to make significant informed contributions. This affirms the quality of the data being used.

4.1.2.4 Level of education.

Under the category of Senior managers 3 (100%) of the respondents attained Masters level. Under the category of middle managers 5 (26.32%) attained Diploma level whilst 10 (52.63%) attained Degree level. The remaining 4 (21.05%) attained Masters Level. None were in the certificate category. Under the category of non managerial staff 20 (25%) attained Certificate level, 35 (43.75%) attained Diploma level and 20 (25%) attained Degree level. There were 10 (12.5%) respondents in the class of Masters level. The character of education is an imperative which provides an insight into the ability of the respondents to comprehend the semi-structured questionnaire and a pointer to the quality of responses.

[N=102]

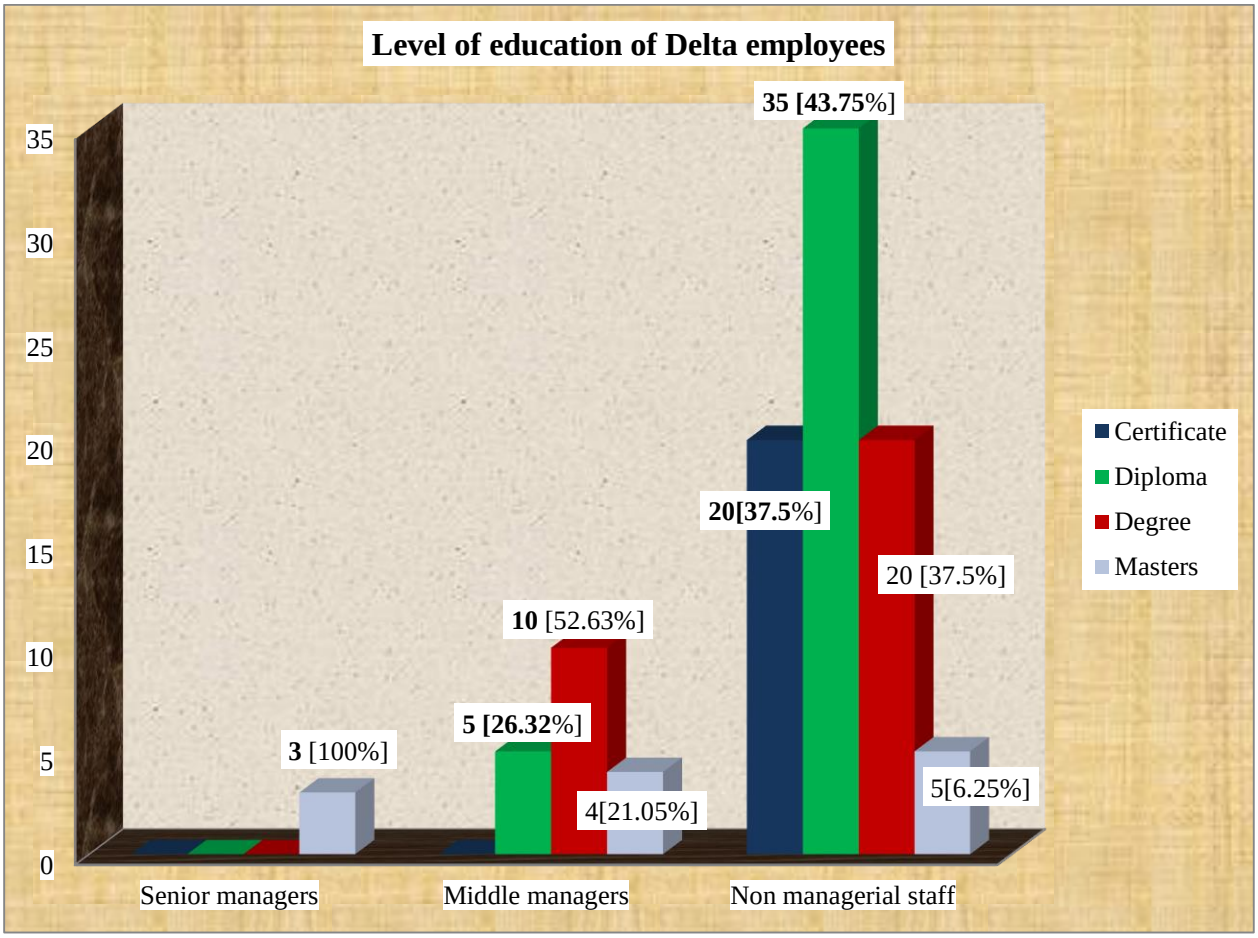


Figure 4.4: Level of education across respondents' categories.

The respondents have attained fair levels of academic achievements as indicated by the qualifications. This justifies the usage of questionnaires in the processes. It also add some credence

to the study itself as information is being given by individuals who appreciate the underlying concepts upon which the study is based.

4.2. Factors influencing the choice of material handling systems at Delta Breweries Bulawayo.

The study sought to establish and interrogate the factors affecting the choice of material handling systems in Zimbabwe focusing on a case study of Delta Breweries Bulawayo. Questions were asked to respondents to establish the factors and the feedback is as indicated below.

Table 4.2: Responses of respondents on the factors which affects the choice of material handling systems at Delta Breweries Bulawayo.

Question	**Responses**	**Statistic**	
What are the key factors to be considered when selecting material handling systems at Delta Breweries Bulawayo?	**Cost**	**Frequency**	**90**
		Percentage	**89.12%**
	Quality	**Frequency**	**93**
		Percentage	**92.08%**
	Lead time	**Frequency**	**75**
		Percentage	**74.26%**
	Load capacity	**Frequency**	**70**
		Percentage	**69.31%**
	Accessibility	**Frequency**	**74**
		Percentage	**73.27%**
	Reliability	**Frequency**	**75**
		Percentage	**74.26%**
	Adaptability	**Frequency**	**50**
		Percentage	**49.50%**

Table 4.3 : Descriptive statistics table

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Cost	99	1	5	4.10	1.345
Quality	99	1	5	4.15	1.242
Lead time	99	1	5	3.89	1.129
Load	99	1	5	3.60	1.224
Accessibility	99	1	5	3.80	1.401
Adaptability	99	1	5	3.26	1.402
Reliability	99	1	5	3.52	1.226
Valid N (listwise)	99				

The respondents acknowledged a number of factors pivotal to consideration of choice of handling system. 90 (89.12%) respondents acknowledged that cost is a key factor to import into consideration when deciding on the best material handling system. 93 (92.08%) respondents acknowledged that quality desires should be considered when deciding on the best material handling system. Other respondents constituting lead time 75 (74.26%) were of the opinion that lead time is of considerable importance in deciding on material handling system. 70 (69.31%) respondents acknowledged that load capacity is an important consideration in the selection process of best handling process. 74 (73.27%) respondents opined that accessibility is fundamental in the consideration of an appropriate handling system. A clique of 75 (74.26%) respondents identified reliability as an important factor in deciding on the best material handling system. Another proportion of 50 (49.50%) respondents acknowledged that adaptability is a key factor to import into consideration when deciding on the best material handling system. Out the numerous factors cited, cost and quality received notable popularity. What it therefore implies is that these aspects should be given preeminence on the catalog of considerations. The finding tallies with outcomes in the previous studies on related subject.

The descriptive statistics substantiate the claim of the finding that cost and quality are the main factors as those with high figures of approval are reflected by corresponding mean level. Cost and quality are the most dominant factors with a mean of 4.10 and 4.15 respectively.

4.3. The impact of choice of material handling systems on the competiveness of Delta Breweries Bulawayo.

It was an imperative thrust of the study to interrogate the impact of choice of material handling system at Delta Breweries Bulawayo. Questions to solicit perceptions were posed to respondents through the semi structured questionnaire and numerous challenges were mentioned. A compendium of these responses are aptly tabulated and displayed below.

Table 4.3: Responses on impact of choice of material handling systems on the competiveness of Delta Breweries Bulawayo.

Question	**Responses**	**Statistic**	
What is the impact of choice of material handling systems on the competitiveness of Delta Breweries Bulawayo?	**Inspires cost leadership in the industry**	**Frequency**	**93**
		Percentage	**92.08%**
	Enhanced product quality	**Frequency**	**90**
		Percentage	**89.12%**
	Customer satisfaction	**Frequency**	**75**
		Percentage	**74.26%**
	Production capacity	**Frequency**	**70**
		Percentage	**69.31%**

Table 4.6 : Descriptive statistics table

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Inspires cost leadership	99	1	5	4.14	1.345
Enhances product quality	99	1	5	4.10	1.242
Customer satisfaction	99	1	5	4.20	1.129
Influences production capacity	99	1	5	4.10	1.224
Valid N (listwise)	99				

The respondents acknowledged several ways through which the choice of material handling system impacts on the competitiveness of Delta Breweries Bulawayo. 93 (92.08%) respondents acknowledged that choice of material handling system inspires cost leadership in the organisation against competitors. 90 (89.12%) respondents acknowledged that choice of material handling system bring about desires quality of products and services in the organization. 75 (74.26%)

respondents acknowledged that choice of material handling system determine the level of customer satisfaction. 70 (69.31%) respondents acknowledged that choice of material handling system directly influences production capacity and efficiency.

The presented data points to key issues that magnifies the significance of the factors of consideration and ultimately the competitiveness of the organization in the space of competitors. If the material handling system is not properly chosen, there would be repercussions to the performance of the institution. This affirms the findings made in the previous studies in other jurisdictions.

The descriptive statistics substantiate the claim of the finding that material handling choice has a significance on the overall performance metrics of an organisation. It significantly influences variables such as cost leadership in the organisation, desired quality levels of products and services in the organization, customer satisfaction and the production capacity and efficiency. The lowest mean of these variables is 4.10 on the licket scale falling in the category of agree. This implies that on average the respondents agree that the choices of material handling system influence the status of these outcomes. At a mean of 4.2, the respondents agree that customer satisfaction is a significant outcome of choice of material handling system.

4.4. Suggestions on policy guidance when selecting material handling systems at companies in Zimbabwe.

The study was ultimately inspired by the desire to establish critical factors which are profound in deciding on the choice of material handling system of any competitive organization in the contemporary context. Diverse views were solicited from the respondents who outlined their informed contributions on factors that brings about high levels of competitiveness to the organization. Tabulated results below present the touted factors which were obtained through the questionnaires.

Table 4.4: Suggestions on policy guidance when selecting material handling systems at companies in Zimbabwe.

Strategies	**Statistic**	**Proportion of responses**
Clear organisational goals	**Frequency**	**95**
	Percentage	**95.96%**
Comprehensive catalog of factors to be considered as a matter of policy	**Frequency**	**90**
	Percentage	**90.91%**
Technological perspectives of material being considered	**Frequency**	**70**
	Percentage	**70.71%**
Ultimate customer preferences	**Frequency**	**96**
	Percentage	**96.97%**
Competitiveness of ultimate cost	**Frequency**	**92**
	Percentage	**92.93%**
Engaging material handling consultancy	**Frequency**	**80**
	Percentage	**80.81%**

Table 4.8 : Descriptive statistics table

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Clear organisational goals	99	1	5	3.56	1.345
Comprehensive catalog of factors to be considered as a matter of policy	99	1	5	3.44	1.242
Technological perspectives of material being considered	99	1	5	3.80	1.11
Ultimate customer preferences	99	1	5	2.81	1.401
Competitiveness of ultimate cost	99	1	5	2.73	1.402
Engaging material handling consultancy	99	1	5	3.20	1.224
Valid N (listwise)	99				

Conscious of the need to provide a comprehensive and competitive policy to the material handling systems of Delta Brewery Bulawayo and other similar organizations in Zimbabwe, several suggestions were tabled to inform policy framework. The posited suggestions received varying levels of magnitude. 95 (95.96%) recommended the construction of clear organisational goals so

that choices are in sync with ultimate organisational desires. 90 (90.91%) suggested a comprehensive catalog of factors to be considered as a matter of policy when deciding material handling system. 70 (70.71%) suggested that technological perspectives of material being considered should always be considered when deciding material handling system. 96 (96.97%) suggested that customer preferences on quality and quantity should inform the preferred material handling system choices. 92 (92.93%) of the respondents suggested that competitiveness of ultimate cost is of paramount importance and Delta Breweries Management should always the cost being incurred by rivals and strive to choose systems with relatively lower cost. 80 (80.81%) of the respondents suggested that the organization should, where possible, engage material handling consultancy for expert guidance.

A glance at the posited suggestions gives an impression that key issues to be factored in when selecting material handling system are ultimate determinants of the fate of business in the wake of competition. The findings are also cameral to findings displayed in the preceding studies on related variables.

The descriptive statistics point to the need of a firm strategy capable of giving the organisation a competitive edge over its rivals. The dominant strategies pointed by respondents are the consideration of modern technological issues involved, engagement of consultancy and introduction of a recommended catalog. These variables have mean above 3. These findings resonate with outcomes of previous studies by Sanchez and Perez (2019). He posited that technology is a significant consideration and organisation should constantly consider it when making decisions relating to material handling.

4.5. Presentation of data obtained through interviews

4.5.1. Factors influencing the choice of material handling systems at Delta Breweries Bulawayo.

The study sought to establish and interrogate the factors affecting the choice of material handling systems in Zimbabwe focusing on a case study of Delta Breweries Bulawayo. Questions were asked to respondents through interviews to establish the factors and the feedback is as indicated below.

Question..... **"What are the key factors to be considered when selecting material handling systems at Delta Breweries Bulawayo?"**

The respondents acknowledged a number of factors pivotal to consideration of choice of handling system. 3 (100%) of the interviewed respondents acknowledged that cost is a key factor to import into consideration when deciding on the best material handling system. 3 (100%) of the interviewed respondents acknowledged that quality desires should be considered when deciding on the best material handling system. 2 (66.67%) of the interviewed respondents were of the opinion that lead time is of considerable importance in deciding on material handling system. 3 (100%) of the interviewed respondents acknowledged that load capacity is an important consideration in the selection process of best handling process. 1 (33.33%) of the interviewed respondents opined that accessibility is fundamental in the consideration of an appropriate handling system. 3 (100%) of the interviewed respondents identified reliability as an important factor in deciding on the best material handling system.

Out the numerous factors cited, cost and quality received notable popularity. What it therefore implies is that these aspects should be given preeminence on the catalog of considerations. The management however emphasized that these factors depends with the nature material under consideration and the goals of the organisation.

One of the Senior Managers said, ..'***Material handling systems depends on the nature of the product and outcome and in many ways vary according to the subject under consideration. However quality and cost are key issues to consider in line with corporate governance issues***'

The general view is that choices are highly dependent with variations and goals of the organisation.

4.5.2. The impact of choice of material handling systems on the competiveness of Delta Breweries Bulawayo.

It was an imperative thrust of the study to interrogate the impact of choice of material handling system at Delta Breweries Bulawayo. Questions to solicit perceptions were posed to respondents through the semi structured questionnaire and numerous challenges were mentioned. A compendium of these responses are captured below.

Question..... **"What is the impact of choice of material handling systems on the competitiveness of Delta Breweries Bulawayo?"**

The respondents acknowledged several ways through which the choice of material handling system impacts on the competitiveness of Delta Breweries Bulawayo. 3 (100%) of the interviewed respondents acknowledged that choice of material handling system inspires cost leadership in the organisation against competitors. 3 (100%) of the interviewed respondents acknowledged that choice of material handling system bring about desires quality of products and services in the organization. 3 (100%) of the interviewed respondents stated that choice of material handling system determine the level of customer satisfaction. 2 (66.67%) of the interviewed respondents acknowledged that choice of material handling system directly influences production capacity and efficiency.

The presented data points to key issues that magnifies the significance of the factors of consideration and ultimately the competitiveness of the organization in the space of competitors. If the material handling system is not properly chosen, there would be repercussions to the performance of the institution. This affirms the findings made in the previous studies in other jurisdictions.

4.5.3. Suggestions on policy guidance when selecting material handling systems at companies in Zimbabwe.

The study was ultimately inspired by the desire to establish critical factors which are profound in deciding on the choice of material handling system of any competitive organization in the contemporary context. Diverse views were solicited from the respondents who outlined their informed contributions on factors that brings about high levels of competitiveness to the organization. The expression of suggestions below presents the touted suggestions from the interviewed leadership.

Question..... **" What are your suggestions on policy guidance when selecting material handling systems at companies in Zimbabwe?"**

Conscious of the need to provide a comprehensive and competitive policy to the material handling systems of Delta Brewery Bulawayo and other similar organizations in Zimbabwe, several suggestions were tabled to inform policy framework. The posited suggestions received varying

levels of magnitude. 3 (100%) of the interviewed respondents suggested the construction of clear organisational goals so that choices are in sync with ultimate organisational desires. 3 (100%) of the interviewed respondents suggested a comprehensive catalog of factors to be considered as a matter of policy when deciding material handling system. 3 (100%) of the interviewed respondents suggested that technological perspectives of material being considered should always be considered when deciding material handling system. 3 (100%) of the interviewed respondents suggested that customer preferences on quality and quantity should inform the preferred material handling system choices. 3 (100%) of the interviewed respondents of the respondents suggested that competitiveness of ultimate cost is of paramount importance and Delta Breweries Management should always the cost being incurred by rivals and strive to choose systems with relatively lower cost. 3 (100%) of the interviewed respondents of the respondents suggested that the organization should, where possible, engage material handling consultancy for expert guidance.

A glance at the posited suggestions gives an impression that key issues to be factored in when selecting material handling system are ultimate determinants of the fate of business in the wake of competition. The findings are also cameral to findings displayed in the preceding studies on related variables.

4.6. Summary

The chapter presented field data as indicated by respondents. The data was presented in a systematic pattern covering both quantitative and qualitative aspects as selected on the methodological facets. Quantitative data was presented using tables and graphs. Qualitative data was presented using text format and content analysis performed. The co-adoption of both qualitative and quantitative techniques amplified lucidity in the overall understanding and cured pitfalls in either approach. The next chapter focuses on summary, conclusion and recommendations.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0. Introduction

The chapter presents summary, conclusion, recommendations, explicate study limitations and areas requiring further studies. The chapter also aptly presents key research outcomes in a summarized but informative form in answer to the objectives of the study. The conclusions were logically drawn from the findings of study. The chapter also presents important recommendations which were rigorously solicited to put an end to challenges emanating from overlooking key factors when deciding on appropriate material handling system.

5.1. Research summary

The focal point of the study was hinged on the desire to establish key factors which enhances competitiveness of the choice of material handling system in Zimbabwe. The study focused on interrogating factors influencing the choice of material handling system in Zimbabwe. A case study of Delta Breweries Bulawayo was used with a specific consideration of periods from January 2020 to December 2022. This was after a realization of increased cost arising from poor choices which would also complicate the ability of an organisation to efficiently deliver goods and services to ultimate clients. The outcomes of the study were strategically orchestrated to serve as a vital cog in the drive to realize the aspirations of National Vision 2030 and National Development goals. In order to fully canvass and elucidate on the key factors that can be employed, the study was guided by the following objectives; to canvass factors influencing the choice of material handling systems in Zimbabwe focusing on a case of Delta Breweries Bulawayo, to establish the impact of choice of material handling systems on the competiveness of Delta Breweries Bulawayo and to solicit recommendations which informs policy guidance when selecting material handling systems at companies in Zimbabwe.

Pertinent research questions were constructed to address the study objectives. Relevant literature from journals, policy documents and official reports was reviewed to provide a detailed understanding and exposition of pertinent study variables in the field of material handling and on the key factors critical in the selection of material handling systems.

The study imported pertinent theories from prominent proponents to formulate a comprehensive theoretical framework which gave guidance and solid grounding. The models upon which the study was hinged are the Ideal System Approach, Material Handling System Design and the Transactional Cost Economics Theory. The models provided imperative lenses through which the current study could be located. The study adopted quantitative and qualitative approaches simultaneously. This triangulation allowed the shortcomings of one approach to be compensated for by the strengths of the other approach hence giving the study an unparalleled impetus and balance. A case study was employed in the study. Stratified sampling technique was used to select a sample of 102 respondents. It was justifiable under the circumstances due to the stalemate of asymmetry in objects distribution which were heterogeneous. Quantitative analysis was applied on close ended questions and qualitative analysis on open ended questions. Descriptive statistics were used to analyse quantitative data whilst qualitative data was analyzed using the traditional text analysis in the form of themes. A rigorous interpretation exercise was conducted to make a clear exposition of the findings in relation to the literature reviewed in chapter two. 99 questionnaires issued for response and the remaining three senior managers were interviewed. There was a 100% response rate. This explicates sufficiency of respondents' threshold and credibility of the outcomes as a true representative of the views, perceptions and experiences of the target population. There is abundance of evidence from the statistical metrics as further substantiated by textual expression which indicated in the quoted verbatim that there are certain factors which hold preeminence over others when considering material handling systems in an organisation.

5.2. Main research conclusions

The study was hinged on the desire to establish key factors which enhances competitiveness of the choice of material handling system in Zimbabwe. The study focused on interrogating factors influencing the choice of material handling system in Zimbabwe. A case study of Delta Breweries Bulawayo was used with a specific consideration of periods from January 2020 to December 2022. This was after a realization of increased cost arising from poor choices which would also complicate the ability of an organization to efficiently deliver goods and services to ultimate clients. The outcomes of the study were strategically orchestrated to serve as a vital cog in the drive to realize the aspirations of National Vision 2030 and National Development goals. At the end of the study, key conclusions are as presented below.

5.2.1. **Factors influencing the choice of material handling systems at Delta Breweries Bulawayo.**

The study sought to establish and interrogate the factors affecting the choice of material handling systems in Zimbabwe focusing on a case study of Delta Breweries Bulawayo. The respondents acknowledged a number of factors pivotal to consideration of choice of handling system. There are costs, quality, lead time, load capacity, accessibility and adaptability as the key factors to be imported into consideration when deciding on the best material handling system.

5.2.2. **The impact of choice of material handling systems on the competiveness of Delta Breweries Bulawayo.**

It was an imperative thrust of the study to interrogate the impact of choice of material handling system at Delta Breweries Bulawayo. Questions to solicit perceptions were posed to respondents and numerous challenges were mentioned. The respondents acknowledged several ways through which the choice of material handling system impacts on the competitiveness of Delta Breweries Bulawayo. These include determination of overall cost, quality desires, desired level of customer satisfaction and production capacity and efficiency.

5.2.3. **Recommendations on policy guidance when selecting material handling systems at companies in Zimbabwe.**

The study was ultimately inspired by the desire to establish critical factors which are profound in deciding on the choice of material handling system of any competitive organization in the contemporary context. Diverse views were solicited from the respondents who outlined their informed contributions on factors that brings about high levels of competitiveness to the organization.

The posited recommendations received varying levels of magnitude. It was recommended that there be construction of clear organisational goals so that choices are in sync with ultimate organisational desires, construction of a comprehensive catalog of factors to be considered as a matter of policy when deciding material handling system, it was recommended that technological perspectives of material being considered should always be considered when deciding material handling system, it also recommended that customer preferences on quality and quantity should

inform the preferred material handling system choices. It was lastly recommended that the organisation should engage material handling consultancy for expert guidance.

5.3. Areas for further research

- Other researchers may focus on the impact of material handling systems on the competitiveness of Zimbabwean companies.
- The other area of interest is to interrogate the nexus between material handling systems and cost of production cost in Zimbabwe.

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