ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

THE DETERMINANT OF WAREHOUSE EFFICIENCY:

IN CASE OF HEINEKEN BREWERY

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This is to certify that, this thesis is done by **Lake Beminken**, entitled "Determinate of warehouse efficiency, in case of HEINEKEN brewery" for the partial fulfillment of the requirement for the Degree of Masters of Art in Logistics and Supply Chain Management.

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STUDENT DECLARATION

The researcher, Lake Beminken, declare that the thesis entitled “Determinant of warehouse efficiency, in the case of HEINEKEN brewery” is my original work. I have carried out the present study independently with the guidance and full support of my research advisor Fesseha Afewerk (Prof.). Additionally, this study has not been presented for any other university and programs and that all references of materials used have been acknowledged accordingly.

Confirmed by: Lake Beminken Lingerh

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LETTER OF CERTIFICATION

This is to certify that **Lake Beminken** has conducted this thesis on "Determinant of warehouse efficiency in case of HEINEKEN brewery" under my supervision and evaluation. The work is original and suitable for submission for the award of Master of Arts in Logistics and Supply Chain Management here in Addis Ababa University.

Fisseha Afewerk (Prof.)

Signature

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Lake Beminken

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LIST OF ACRONYMS

WH	warehouse
WMS	Warehouse Management System
SPSS	software package for social science
SOP	Standard Operation Procedure
SKU	Stock Keeping Unit
ANOVA	Analysis of Variance
USD	USA Dollars
ERP	Enterprise Resource Planning
QR code	Quick Respond Code
RFID	Radio Frequency Identification
FEAHP	Fuzzy Extended Analytical Hierarchy Program
ITS	Information Technology
DC	Distribution Centers
ICT	Information Communication Technology
FLT	Forklifts
PPESA	privatization& Public Enterprise Supervising Agency
WERC	Warehouse Education and Research Council

ABSTRACT

Warehousing refers to the activities involving the storage of goods on a large-scale in a systematic and orderly manner and making them conveniently available when needed. The objective of this study was to identify the basic factors of warehouse efficiency in Heineken brewery. To achieve the objectives of this study descriptive and explanatory research design was used. Data was collected through a questionnaire survey from a total of 70 employees. The determinant of warehouse efficiency data was collected from respondents by using a five-point Likert-scale while the Cronbach alpha was used to check the data for the reliability of measurement scales. To analysis, the determinant of warehouse and warehouse efficiency in the proposed model, Statistical Package for Social Science (SPSS) version 23 software utilized as the analytical technique of choice. The analysis results of this study indicate that the determinant of the warehouse such as (warehouse location design, inventory location, warehouse management system, and effective communication) has a strong relationship with warehouse efficiency. The findings of the study also indicate that employees were well aware of the basic factors of warehouse efficiency. The results also indicate that, unlike effective communication, the remaining three factors (warehouse location design, inventory location, and warehouse management system) have a relatively more positive and significant effect on warehouse efficiency. The coefficient table depicts that the significant regression coefficients for warehouse location design, inventory location, warehouse management system and effective communication are significant at p=0.05, this significance level tells us variables can significantly predict the analysis of warehouse efficiency. Based on the findings of the study, numerous recommendations listed, including that effective communication should be given higher priority to improve warehouse efficiency, but also since this activity is at the closest interface with the customer - customer satisfaction is at risk.

Keyword

Warehouse, warehouse efficiency, warehouse layout design, inventory location, warehouse management system, effective communication

CHAPTER ONE: INTRODUCTION

This chapter introduces overall information about the research conducted on the key factors (determinants) of warehouse efficiency in one company's outbound and inbound warehousing activities and insights about the ground and assumptions on which it bases the study. The chapter contains the background of the study, a statement of the problems, research questions, research's major and specific objectives, scope of the study, the significance of the study, and the organization of the study.

1.1 Background of the study

According to (Kaur G, 2015) states that in today's highly competitive global marketplace the pressure on organizations to find alternative ways, to create value and deliver it to their customers grows ever stronger. The increasing need for the industry to compete with its products in a global market across cost, quality, and service dimensions has given rise to the need to develop more efficient warehousing strategies. It recognizes warehousing as a distinct function with the rise of mass production systems. Warehousing is the storage of goods, whereas the distribution center precedes post-production, a warehouse for finished goods held for distribution. (Coyle *et. al,* 2003) states that warehousing and distribution centers have the same function as goods and product storage.

Warehouses and distribution centers are very important nodes in a supply chain network. According to (Andre Langevin and Riopel Diana, 2005) presents that the warehouse and distribution perform valuable functions that support the stock-keeping unit (SKU) assortment and assembling shipments. The efficient management of the warehouse helps to optimize the existing production and distribution processes and assist in the goal of cost reduction and service enhancement.

Based on (Grant, 2006) states that in the supply chain, warehousing function is very critical as it acts as a node in linking the material flows between the supplier and the customer. In today's competitive market environment, companies continuously improve their warehousing operations. Many companies have also customized their value proposition to increase their customer service levels, which has led to changes in the role of warehouses.

According to the (www.FDM4.com>solution>wms news report) improving warehouse efficiency means optimizing productivity to save time and money, and making improvements regularly is essential to staying relevant within the industry. The basic reasons to improve warehouse efficiency include increased accuracy of stocks, maximized the speed of delivery and shipment, increases customer satisfaction, and reduced the labor cost for the company. Warehouse efficiency improves through reviewing your process regularly, review your warehouse layout & organization, track your product, forecast and monitor your stocks, focus on employment training, engagement satisfaction and use technology to your advantage.

Companies must operate with maximum efficiency and provide superior service to ensure profitability. Based on (Lakmal AGDP and Wickramarachchi WADN, 2011) research results, the most comprehensive international tools to measure the warehouse efficiency three factors found to affect efficiency and effectiveness of the warehouse operations concerning the fast-moving consumer goods in the industry such as simplicity/complexity of the warehouse management systems, product slotting techniques and layout planning of the warehouse. The organizations' ability to manage the warehouse reduces costs and fulfillment operations are critical areas to their success within the competitive market. It is appropriate to mention and articulate that organizations face significant challenges in managing warehouses.

Based on (John and Bowen, 2008) statement the role and importance of warehouse in the American economy have altered to a great extent because of changes in the way of raw materials, intermediate goods, and finished products. In the present setup when customer satisfaction and service have become a prime reason for they see a business to stand apart from its competition as more important and fundamental. Thus, the warehouse operating system would be designed for receiving inventory, timely order fulfillment to automate validation of warehouse activities, and accurate inventory control to achieve peak performance across the entire enterprise.

According to (Sople V. V, 2010) warehousing network plays a major role in the physical's successful distribution of products. They observe that the leading firms adopt and implement original warehousing strategies such as capacity switching, hub networking,

Cabling, and outsourcing. We propose both analytics and simulation models for improving warehouse design practices. Analytic models are usually design-oriented and explore many alternatives quickly to find solutions. Simulation models are usually analysis oriented. They provide an assessment of design, but usually have limited capability for exploring the design space.

Based on (GuJ Inxiang's, 2010) research results to use the analysis and simulation approach to integration needs to achieve more flexibility in analyzing warehouse problems. Successfully, managing a warehouse requires processes and procedures, both easy to follow and execute. It also requires experiencing and equipped employees who understand the importance of their jobs. (Andrew Campanula, 2017) states that receiving, storing, picking, packing, shipping, and replenishment are the major areas involved in operating a warehouse and each area has its unique challenges for management.

Thus, this study aims to describe, identify, and analyze the relationship between warehouse efficiency and its factors that determine the optimum performance (warehouse efficiency) in warehousing activity. The study had described and investigated the impact and role of inventory location, warehouse layout design, warehouse management systems, and the role of effective communications (information sharing) for the efficiency of a warehouse in HEINEKEN brewery for the kilinto site in Ethiopia.

The study also suggested future action to improve warehouse efficiency from the perspective of capacity, customer satisfaction, residence time, and service quality. Finally, this research will contribute the warehousing activity as an indicator of an improvement area and the purpose of the major factors that are affecting warehouse efficiency with manufacturing industries in Ethiopia.

1.2. Statement of the problem

In existing situations, warehouse management for the enterprise is a much more critical and predominant area of the company’s sustainability. (Surie &Reuter, 2015) describes that warehouse management would examine in at least three key areas of processes like procurement, production, and Distribution.

Warehouse efficiency is a concept difficult to define. We can define efficiency as a measurement (usually expressed as a percentage) of the actual output to the standard output expected. Efficiency measures how well something is performing relative to existing standards; in contrast, productivity measures output relative to a specific input. Efficiency is the ratio of inputs and outputs of one operation. One warehouse efficiency would be affected by the skills and knowledge of managers that have to lead the warehousing activity and functional and departmental strategic plans. To increase the efficiency of the warehouse, the managers take the lead to identify and determine the warehouse location, design, proactively manage and plan the inventory locations, use the digital systems for administration, and proper communication (information sharing) between the teams.

During the preliminary assessment, the researcher observed some indicators of major warehousing problems, including that some storage areas congested while others were under-used, overstocking, and under-stocking. Signs of poor stock control measures poor customer handling, poor communication between shift employees, inadequate warehousing facilities (i.e. light and parking areas), and finally a dual system of manual and electronic systems employed dually by the company.

The researcher conducted a preliminary interview on stating of this study the managers and top management teams believed that it is valid studying for determinate factors of warehouse efficiency inventories location and communication barriers. The company faced a warehousing problem for a year and stated that we have idle stock within the warehouse and critical traceability problems for specific Stocks (Internal Memo for warehouse activities, 2018).

Therefore, this research provided an analysis of warehouse efficiency problems to the companies in an organized and scientific way. The analysis focused on the impact and role of the warehouse management system, inventory location effectiveness, warehouse location design, and effective communication problems.

1.3 Research questions

This research addressed the following major research questions for determinants of warehouse efficiency for kilinto Heineken brewery warehousing activity.

- What is the effect of warehouse layout on warehouse efficiency in Heineken brewery?
- How the inventory location influence warehouse efficiency in HEINEKEN Brewery?
- What is the effect of utilizing warehousing management systems for warehouse efficiency?
- What is effective communication in warehouse efficiency for Heineken's warehousing activity?

1.4 Research objectives

The objectives of this study categorized as general and specific objectives.

1.4.1 General objectives

The general aim of this study is to examine the determination of warehouse efficiency in the case of the Heineken brewery kilinto site.

1.4.2 Specific objectives

Based on the above research questions, the researcher categorized the specific objectives of this research as follows.

- To analyze the effect of warehouse layout on warehouse efficiency
- To describe the impact of effective inventory locations on warehouse efficiency
- To examine the relationship between the warehouse management system and warehouse efficiency and
- To analysis the relationships between effective communications and warehouse efficiency.

1.5 Significance of The Study

Warehouse efficiency procedures are an important and key part of the organization's plan. It is for this primary reason that utmost care must be taken into consideration to make sure that efficient and effective warehouse management is adopted. The results of this study would be a useful tool for the following different parties;

- ✓ This study has a vital significance for the company to improve warehouse efficiency through developing and creating customer satisfaction and Capacity amendment by indicating and identifying the determinant of warehouse activities.

- ✓ On the other hand, this research result uses for the company decision-makers to take corrective actions based on researcher findings and recommendations and to put their plans against the weakness of their company in proactively and consistently.
- ✓ Additionally, the study provides to the company to make some change based on the result of this study and to understand how those efficiency indicators affect warehouse efficiency.
- ✓ Besides, the research group will benefit from the study by acquiring knowledge on the issue and used as the reference for further research in the field of warehouse efficiency.

1.6 Scope of the Study

It is impossible to encompass all aspects of the warehouse efficiency determinant of the organization considered in this study. It thus limited the study was thus to assess the determinant of warehouse efficiency in the Heineken brewery kilinto site warehouse and transport department. It categorized the study into three fundamental parts which were geographical scope, conceptual scope, and time scope.

The researchers limited the geographical scope of the study to Addis Ababa kilinto plant Heineken brewery inbound and outbound warehousing activity. The study did not cover or include other sister companies of HEINEKEN breweries like Bedele and Harar Brewery. The reason to encompass only the selected target department was that they have a direct relationship with warehousing activity.

In the conceptual scope, I limited the study in identifying the determinant of warehouse efficiencies from the perspective of capacity and customer satisfaction. In its time scope, it limited the study to accomplish within a time frame of eight months.

1.7 Definition of Terms

Warehouse;-The warehouse is a building for storing goods. Warehouses are used by manufacturers, importers, exporters, wholesalers, transporter businesses, and customers. They are usually large plain buildings in industrial parks on the outskirts of cities, towns, or villages (Wikipedia, the free encyclopedia).

Warehousing Activities; - including putting items away, moving items inside or between warehouses, and picking items for assembly, production, or shipment (Elisa Kusrini*, Fadrizal Novendri, and Vembri Noor Helia,2018)

Efficiency: -The ratio of resources utilized against the result derived (Mentzer & Konrad, 1991) or the measure of how well the resources expended are utilized (Fugate, 2010).

Warehouse efficiency; -The performance of the warehouse is judged by its operations such as timely customer service, keeping track of items, lower operating costs, damage-free delivery, and higher inventory turnover. The efficiency of the material handling process adds to the performance level of the warehouse (Gu *et al*., 2007)

Supply chain; -is defined as a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer(Mentzer, J.T., DeWitt, W., Keebler, J.S., Min, S., Nix, N.W., Smith, C.D. and Zacharia, Z.G., 2001)

Supply chain management; - Is defined as the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, to improve the long-term performance of the individual companies and the supply chain as a whole.*''* (Li, S., Ragu-Nathan, B., Ragu-Nathan, T.S. and Rao, S.S., 2006)

Stock keeping unit (SKU); - is a scannable bar code, most often seen printed on product labels in a retail store. (https://www.investopedia.com/contributors/53430/)

Warehouse layout; -the physical layout and related attribu9tes of a warehouse (https://www.tandfonline.com/toc/tprs20/current)

Inventory location; - An inventory location is a physical place where you store the inventory or a place where you store a particular classification of inventory such as spare parts, office supplies, or consignment inventory (supply chain management user Guides,2014).

Warehouse management systems; - A warehouse management system (WMS) is software and processes that allow organizations to control and administer warehouse operations from the time the goods or materials enter a warehouse until they move out (Rouse, M. and Green, I.T., 2016)

Effective Communication (information sharing); - Effective communication is about more than just exchanging information. It's about understanding the emotion and intentions behind the information. (Lawrence Robinson,*et .al*, June 2019)

1.8 Organization of the Study

The entire paper will be classified into five chapters.

The first chapter deals with the backgrounds of the warehouse management, warehouse activities, and factors that determine the warehouse efficiencies theories have been discussed. A statement of the problem, research questions, the objective of the study, the significance of the study, limitations/delimitation of the study, and scope of the study are presented in detail.

Chapter two is focused on related literature reviews which reflects theoretical, empirical, and conceptual reviews and definition of some concepts for the improvement of warehouse efficiencies and factors that had affected the activities from different perspectives. The conceptual frameworks developed on the base of literature reviews. As much as possible, the gaps in the literature had been identified and presented.

Chapter three of the paper deals with the research methodology to conduct the research which includes the research approach and design, population and sampling technique, sample size, method of data collection, and data analysis.

Chapter four presents data analysis, presentation, and interpretation. The chapter provides a discussion on the reliability of the collected data and discussed the results through descriptive and inferential statistic results.

And finally, in chapter five the paper will try to reflect summary, conclusion, recommendations, and further research limitations based on the research findings and observations.

CHAPTER TWO: RELATED LITERATURE REVIEW

This chapter states that the relation of this study with the previous one other scholar and researchers had written that and focused on providing the theoretical and empirical frameworks to the study by related topics of this study. The literature review clarifies and develops the topics through other interpretations and understandings. It creates a positive and concise environment for readers and every user about warehousing activity optimization (warehouse efficiency).

2.1 Definitions of Warehouse and Warehousing Activity

A warehouse is an essential limb of an industrial unit. It is the depository of all materials required by an industrial unit and supplied materials as and when required. It requires uncommon types of materials for different operations in a production unit. A warehouse is a storage structure constructed to protect the quality and quantity of the stored produce. The need for a warehouse arises because of the time gap between production and consumption of products. Warehousing or storage refers to the holding and preservation of goods until it dispatches them to the consumers. By bridging this gap, storage creates time utility. There is a need to store the goods to make them available to buyers as and when required. Storage enables a firm to carry on production in anticipation of demand.

Warehouse enables the businessmen to carry on production throughout the year and sell their products whenever there is adequate demand. The need for warehouses also arises because it would produce some goods only in a particular season but demanded throughout the year. Similarly, certain products are produced throughout the year but demanded only during a particular season (a comprehensive guide on Materials & supply chain management). The research result presented by (Career Research Library Thu, 24, 2019) is that there are five types of warehouses: private warehouse, public warehouse, automated warehouse, climate-controlled warehouse, and distribution center warehouse. All of them have different operating styles as a warehouse (storage).

From the perspective of Lauren Koppelman (January 23rd, 2020) statement the efficiency of your warehouse is an integral part of your business. When operations run smoothly, customers get their orders on time, your staff stays safe, and it keeps costs to a minimum. If your warehouse is inefficient, you can quickly lose money, orders won’t deliver on time and you’re more likely to experience issues like stock-outs. While the activities at the warehouse are quite complex and interleaved, we take an aggregate approach given the

relative focus of the distribution planning we consider more towards tactical and less operational. With this idea, we use 'put away' to represent all the activities that are involved from unloading, stacking, and eventually put away to the appropriate storage location.

Whereas (Bradley Guthrie, Pratik J. Parikh, and Nan Kong, 2016) states that not treating the warehouse as a node in the distribution network and accounting for several operational details enables us to evaluate the interaction between warehouse, transportation, and inventory decisions simultaneously for both basic and fashion products.

According to (Elisa Kusrini*, Fadrizal Novendri, and Vembri Noor Helia, 2018) warehouse activity consists of receiving, putting away, storage, packing, and shipping. Receiving is an operation that involves the assignment of trucks to dock and the scheduling and execution of unloading activities. Put away is the activity of placing a product or material that has been purchased in the warehouse. This activity includes material handling activities verifying the location of the product material and the placement of the product. Storage is the movement of material from the unloading area to its designated place. Order Picking is order preparation. Storage is regarded as the main and labor-intensive activity of warehouses. Shipping is an activity that involves scheduling and assignment of trucks to docks for the available orders, packing, picking, and the loading to the trucks.

2.2 Theoretical Framework

Efficiency in one warehouse is a topmost to the success of any company with distribution, through this increasing warehouse efficiency is a top priority for warehouse managers everywhere and every time. It's a well-known fact, improving warehouse efficiency reduces overall operational and non-operational costs. Despite this, so many companies haven't yet made the small changes necessary to improve this agenda.

Good warehouse efficiency is not only about putting everything in its place and getting products out on time, but it's also about maximizing productivity while saving time and money. Some practices like labeling are intuitive and can be done without the use of the software. Others like barcodes, scanners, and RFID systems are all part of warehouse and inventory management systems that focus on monitoring the flow of products and enhancing accuracy with software.

Whether you have a multi-channel warehouse or a small warehouse, making some simple changes can easily improve workplace efficiency. Here are some helpful tips for improving a warehouse's performance that can be applied to any warehouse operation. According to (Vero solutions official page,) the warehouse efficiency determined by review effectiveness, warehouse layout, and forecast ahead, track your product, keep on top of stocks, take advantage of technology, implement an incentive program and train the staff.

Clearly stated by (Brynjolfsson et al., 2013; Piotrowicz and Cuthbertson, 2014; Saghiri et al., 2017) that increasingly they integrate their physical stores and online channels into a seamless world of shopping, a concept often referred to as Omni-channel retailing. In some-channels, inventories and order fulfillment are conflated, and customers can place their orders in one channel (e.g. on a smartphone), pick up or receive through another channel (e.g. home delivery), and return products in a third channel (e.g. physical store). (Ishfaq et al., 2016) states that omni-channel retailing represents a competitive and continuously changing landscape, and (Agatz et al., 2008; Beck and Rygl, 2015) states that it has become more important and more difficult to design effective and efficient distribution systems. On the other hand (Bernon et al., 2016; Hübner, Wollenburg and Holzapfel, 2016) research result indicates that essential considerations for distribution systems (also referred to as Omni-channel logistics) include, how and where to keep stock and fulfill orders for store replenishment and e-commerce, and how and where to handle the increasing return flows.

The scientific research result of (Faber et al., 2013; Hübner, Kuhn, and Wollenburg, 2016) states that a critical aspect of distribution systems represented by the warehouse operations carried out at the various material-handling nodes. Based on (Hübner et al., 2015) research finding the major challenge is to effectively combine the handling and shipment of small consumer online orders with large store replenishment orders, new orders, and shipments that previously were handled in separate channels.

As present by Rouwenhorst et al. (2000, p. 515) the efficiency and effectiveness in any distribution network are largely determined by the operations of the node in such a network means the warehouses. Having previously been considered a burden because of high capital and operating expenses (De Koster et al., 2007; Bartholdi and Hackman, 2016), warehouse

operations are now increasingly regarded as a strategic component of supply chains and omni-channel retailing particularly (Hübner, Holzapfel and Kuhn, 2016), and the topic of warehousing is attracting increased attention (Kembro, 2017). Despite the growing strategic importance of warehouse operations, there is a lack of a structured and comprehensive overview of the context of Omni-channel retailing.

As (Galipoglu et al., 2018; Marchet et al., 2018) conclude that it is time to bring knowledge from this stream together and provide a structured and comprehensive overview of omni-channel logistics with a focus on the implications for warehouse operations and design. Such a review would also contribute to filling the recently highlighted lack of research investigating back-end omni-channel logistics.

According to (Bartholdi and Hackman, 2016, p. 3) warehouses can be described as the points in the supply chain where the product pauses, however briefly, and is touched. (Faber et al., 2013) states that the rationale for using a warehouse is to match supply and demand, to consolidate a range of products and to reduce transportation costs and lead times.

According to (Bernon et al., 2016) presentation along with increased e-commerce many distribution warehouses also have extensive return operations. (Bartholdi and Hackman, 2016) first, when products arrive at the warehouse, they are checked for quality and registered before being put-away in the assigned storage location. From the perspective of (Frazelle, 2002) study result storage includes a reserved area and a picking zone. The conclusion includes a limited quantity of each product, also referred to as a stock-keeping item (SKU), that can be easily retrieved (Rouwenhorst et al., 2000). (Gu et al., 2007) stats that SKUs are either dedicated or randomly assigned to a location.

A common approach is to combine dedicated and random storage (class-based storage), which implies that SKUs are dedicated to a certain zone, but within each zone, the SKUs are randomly placed. This approach draws on the benefits of both dedicated and random storage, enabling reduced travel while avoiding congestion.

According to (*Adam Kolinski, Boguslaw Sliwczynski*, 2015*)* evaluation problem and assessment method of warehouse process efficiency journal paper, warehouse processes

are one of the key elements of material flow efficiency along the supply chain. In literature and scientific research, it is difficult to find a comprehensive analysis evaluation warehouse processes efficiency. Lack of unambiguous definition makes it impossible to develop a universal method for evaluation of warehouse processes efficiency. Also, the element hampering the standardization of evaluation methods is the specificity of the warehouse processes.

Warehouse processes can focus on ensuring the flow continuity of the production or distribution process. These problems are the condition for conducting detailed scientific research in this area. Comprehensive analysis of efficiency requires both operational data relating to the technological process, supported by support processes and service, but also the data generated by an information system to ensure their reliability and timeliness. For this reason, the efficiency analysis should ultimately affect the warehouse process, taking into account both the material flow and information flow, as well as the aspects of warehouse management and existing feedback.

Based on Adam Kolinski and Boguslaw Sliwczynski's analysis warehouse efficiency should be based not only on operational indicators, which are directly connected with the warehouse process but also on financial indicators. Aims and indicators used in an analysis of warehouse efficiency should be named complete when it does not only refer to indicators that apply to past results but also when it allows monitoring what affects future results. The problem of complete warehouse efficiency assessment has still not been polished in the subject literature.

Taking into account the ecological aspect, the problem of warehouse efficiency assessment can be based on the assumptions of Balanced Scorecard developed by R. Kaplan and D. Norton. The authors proposed the analysis of efficiency from four perspectives: financial, customer, internal business process, and learning and growth. Efficiency analysis within the warehousing and distribution industry has traditionally focused on comparing quantitative performance measures, such as operating cost-typically measured as warehousing and/or distribution cost as a percent of sales; operating productivity typically measured in units (e.g., lines, orders, cases, pieces, pallets, pounds, etc.) handled per person

shipping accuracy. These operating costs and productivity performance measures are easy to compute and comprehend.

While conceptually simple, these ratio-based performance measures can be seriously misleading. For example, units handled per person-hour ignores the capital investment in material handling and storage systems, which often substitutes for investment in labor. Furthermore, not all units are equal in the amount of handling time required per unit. For example, the popular case quantity shipped per person-hour is often used to compare facilities that perform a combination of broken cases, full case, and pallet picking, which is inappropriate. Regardless of their true efficiency, facilities that perform primarily broken case picking, which requires the time-consuming task of handling individual units within each case, will be rated highly inefficient, while facilities that perform primarily full pallet picking, in which many cases are handled with one simple pallet move, will be rated highly efficient.

According to Kyle T. Bentz (International Business ABS 14-1 2017), warehousing has physical attributes, inventory attributes, and picking routes. Warehouses are a vital part of a company's logistics system. A warehouse can have many different areas to properly receive and send out products. Warehouses are used by entities such as importers, exporters, manufacturers, transport businesses, wholesalers, customs, etc. Most commonly, they are used for storing or acting as a buffer for products. These can be things such as finished products, raw materials, or goods-in-process. Warehouses often act as "in-between points" from the place where they were manufactured to the point of consumption.

2.3 Empirical Review

2.3.1 Effective Warehouse Layout Design and Warehouse Efficiency

(Reid Curley on Jan 17, 2017) states that warehouse layout and space utilization are key factors in determining warehouse efficiency. If parts of your warehouse are congested or difficult to work in, things will slow down. With the use of modern Warehouse. Management Systems, you can simulate the effect on your activity that releasing a group of orders will have before you do so. Your team will be routed along the most effective paths.

The WMS will take into account your layout as well as any equipment like VLMs or carousels to dispatch orders effectively. It will also help identify products that move quickly and should be stored in locations that are easily accessible to make the most of your available storage space.

Based on (Harper, R.L., 2010) states that to stay competitive in today's tough market the location of your warehouse is vital. This factor could mean the difference between success and failure of your company. The location of your warehouse affects your transit time as you ship orders to your customers, your budget, and your customer service (providing what they order within a reasonable time). According to this article, the warehouse location determines computational and local demographics, sustainability, infrastructure and layout, accessibility, cost, leave room for growth and environment.

In general, the article states that warehouse efficiency is directly affected by the warehouse layout. If the location of your warehouse was very important, you should also consider the site itself. The site and building need to meet the specific size, infrastructure, and capacity requirements of your organization. When choosing your warehouse, think about the volume of products that will pass through your warehouse each week, month, and year, and make room for any seasonal changes.

The flow of your warehouse is essential, so finding a warehouse that comes with existing storage infrastructure could serve as a huge advantage to you. Choosing the right location can make all the difference when it comes to offering the best service and accessing the right infrastructure while improving your accessibility and lowering your overall cost.

From the perspectives of *(Berman, B. and Thelen, S., 2004)* developing an effective warehouse layout process is one of the basic operations. A well-run warehouse is the foundation of a well thought out warehouse layout. A layout that provides a solid base can lead to improving productivity and control of the accuracy of overall operations. On the reverse, a poor warehouse layout can lead to a numberless of issues and concerns.

Regardless of whether you have an existing building and want to change the layout, expand what you have, contract what you have, or move to a new facility all of the same steps in the process apply. There are different steps in one warehouse layout preparations. Some of

them gather key metrics and develop a set of layout requirements, prepare a general “Block Diagram” of layout, develop and review possible layout options, and agree on the general layout diagram and decide on the best features from various options and develop a final detailed layout.

It makes note of any worrying areas that might be holding up your machines or workers regarding the warehouse layout and inventory flow systems. The conduciveness and cost-effectiveness of the warehouse location measured by the waiting time of trucks within the compound and offloading/loading area, the proximity of an area to the trucks, the conduciveness’ of truck trafficking area till offloading/loading of products and lead time between stocking blocks and offloading area. All the listed points should have to be parameterized and analyzed for the Heineken brewery warehousing layout during this study.

When deciding on the layout for a warehouse the objectives should clearly be defined Martin Murray according to this saying one warehouse layout has to depend and determine through the settled objectives that have been performing in the future. Before deciding the warehouse layout the designer should look and define your objectives before beginning the planning process, know your local building codes, seek into historical data in your warehouse management system (WMS), understand how goods circulate through your facility, determine spatial relationships between the various areas of the warehouse, create a process and in addition to your processes you need to have an in-depth understanding of your inventory.

In another context, inventory locations are used to determine where items are stored and where items are picked from a warehouse. The term location refers to the place that items are stored and drawn from. For each location, the place where the item is inserted can also be specified. By default, they are the same. Items are usually inserted and drawn from the same side of a location, but not always. For example, items that are stored in live storage racks are inserted from one walkway and drawn from another. The main input is given by a location name, which is usually determined by its coordinates: warehouse, aisle, rack, shelf, and bin. Names and IDs can be entered manually or generated from location coordinates. A location has the following characteristics:

- Size (height, width, depth, and thereby volume)
- Warehouse, aisle, rack, shelf, and bin position
- Location type (bulk location, pick the location, inbound dock, outbound dock, production input location, inspection location, or Kanban supermarket)

In general and concise definition inventory location indicates or prescribes the proper and standardizing stacking of inventories within the warehouse to increase the capacity of the warehouse through standardization and following working procedure for inventories in one warehouse.

2.3.2 Inventory Location and Warehouse Efficiency

According to the paper that was published under the title of Storage allocation optimization model in a Colombian company by (Frank Alexander Ballesteros-Riveros, Martin Darío Arango-Serna, and Wilson Adarme-Jaimes & Julian Andres Zapata-Cortes Ballesteros-Riveros, F.A., Arango-Serna, M.D., Adarme-Jaimes, W. and Zapata-Cortes, J.A., 2019) jointly specified that inventory allocation in the warehouse consists of deciding the correspondent area in which products allocated. It could be completed by using a different technique to establish a specific position for the products.

Some applications provide solutions and evaluate results independently, allowing the identification of its potential in the warehouse. This paper grants the application of the storage allocation model in a food and beverage company considering several products on a defined time horizon. The algorithm identifies the operation area and the corresponding spaces that are required for the allocation of the products, aimed at reducing holding and material handling costs.

On the other hand (Tompkin*s et al.)* presents that in today's business operation around 20% to 50% of the total operating expenses in manufacturing companies are accredited to good storage and handling. An efficient facility plan can reduce around 10% to 30% of those costs. In that way, facilities and operation design is a very important activity for which companies should develop sophisticated systems to ensure a fast and effective response to customers' needs and permanent improvement of internal processes. One important decision in facility and operation planning in the design and dynamic allocation of storage spaces which can be done using mathematical techniques that establish the allocation of

different items in specific spaces into warehouses. The quadratic allocation method is used to model the allocation of products which consist assignment of a set of elements into a set of spaces when the distances between all locations and the flow of the products are known.

2.3.3 Impact of Warehouse Management System for Warehouse Efficiency

Based on (*Gomes, C.F.S., Ribeiro, P.C.C. and de Matos Freire, K.A, 2016*) in their published journal that had presented for readers on the topics of warehouse management systems, WMS is an IT utilization to improve the results in logistics activities, mainly warehouse operations. The software leads to a better issue in the activities (receive, inspection, address, storage, separation, package, shipping, document sending), registers, warehouses, and sends to other IS accurate information, reducing errors, and as a consequence of costs.

Therefore, this system leads to a higher customer service level because productivity can increase. Because the quantity of data is high this IT has to be integrated with other ITs, as some software with FEAHP, QR Code, ERP, and some hardware (RFID). Based on their published stream of research in the sample of this paper, it has a dispersion in countries and authors, through Asia and Europe concentrated more than 70% of issues. There is an oscillation by several publications each year.

According to *(*Simchi-Levi, D., Kaminsky, P. and Simchi-Levi, E., 2004*)* research findings and clarification, a modern, efficient supply chain is the price of entry in business today, and the warehouse is the backbone that keeps the supply chain flowing smoothly. However, you can't keep the warehouse running effectively without visibility into supply and demand. You need technology to optimize and balance inputs and outputs. Additionally, you need an effective way to communicate quickly and reliably with every member of your extended supply chain. Many third-party logistics (3PL) companies offer collaboration and communication software platforms that integrate with your other business systems to provide insight to help you make the right decisions.

According to (Williams, J., Bhaskaran, R., and Martin, C., 2016) published magazine a warehouse management system (WMS) is a software application that is specifically designed to optimize an organization's warehouse or distribution center (DC) and its operations. The warehouse management system that you choose allows an organization to

manage the entire process - from the time stock enters to your warehouse until it's shipped to your customers. The warehouse management system used to plan, organize, and optimize the available warehousing operations. The system aims to ensure and monitor to provide the right goods at the right time while optimizing both efficiency and cost. The function of warehouse management system includes on the area of inbound logistics (yard management and appointment scheduling, receiving, reverse logistics and cross-docking) on the area of inventory management and control (put away, full stock take, cycle counting, and loot and serial tracking) and on the area of outbound order processing the warehouse and management system functions as (wave planning, picking outbound quality).

Finally, the system functions on the shipping and loading part of one warehouse as loading building and loading, rating and routing, and shipping documentation. The system has its features and modules. The critical features are -

- Core warehouse management
- Slotting optimization
- Labor management
- Billing Management and
- Warehouse mobility

The WMS has multiple importance in one company's warehousing activities. Some of them are listed as follows

- Accurate demand forecasting
- reduced labor costs due to efficient labor allocation
- Streamlined warehouse processes
- Optimized warehouse layout
- Improved inventory accuracy
- Improved pick accuracy
- Decreased time between picks
- Improved warehouse flexibility and responsiveness
- Improved warehouse safety and security
- Improved supplier relationships
- Improved customer service levels and
- The ability to implement an ongoing optimization strategy

In general, one WMS is a digital system that used to control and trace the available space within a warehouse, to administer the availability of stocks with a warehouse based on their return and production dates. The system improves the traceability of warehouse spaces and products within a warehouse and improves customer satisfaction by reducing the slot and residence time of picking orders and customers within warehouse respect.

2.3.4 Relationship between Effective Communication and Warehouse Efficiency

Based on (David Bruce & Shirly's y.colomon) findings in their article on improving communication via management (02 August 2010) one of the fundamental problems affecting the day-to-day running of companies is communication. There is a lack of awareness on the impact that changes in one department to other departments (e.g. if production efficiency is increased by 10% what impact will this have on warehousing). According to this article, the use of Pareto analysis and problem-solving techniques helped to improve efficiency and utilization. This will be a tremendously valuable tool for the company as it will have many different applications, such as calculating manning requirements, identifying potential cycle time reductions, and optimizing warehouse space.

In general, different scholars conclude that effective warehouse communication had built overbuilding equipped employees with phones & radios for the effective transition of messages, distributing wearable GPS devices to the staff is another way to reorganize warehouse operations and developing a clear structure for communication protocols has improved the warehouse efficiency.

According to *(*Kimberlee Leonard; reviewed by Jay Thomson, January 2019*)* effective communication and teamwork will help a business to maintain a positive work environment. Effective communication also permeates through all areas of business operations because a positive workplace means happier employees are interacting with the public and with consumers. On another side related to the previous topic *(*Sandeep Kashyap December 4, 2017) the success of the project depends a lot on your team, it should be strong and it can be strong only if there are effective communication strategies. So, the importance of flawless frequent communication has grown quite a lot in recent times.

Frequent communication means to keep everyone in the loop both in person and via technology. Business leaders and experts should care how to keep employees stay informed through regular communication keeping in mind the importance of team communication. The value of communication between a company's team members can't be overstated. Among other benefits, effective workplace communication builds relationships and trust between colleagues, maintains transparency in the workplace, enables better employee management, boosts morale, and facilitates innovation.

In short, effective communication is key to one business's productivity and bottom line. The importance of effective communication is becoming important for team members to know what their fellow team members are up to their ideas and their plans to carry forward the project. The manager or the team leader should delegate roles and responsibilities as per the interest of their teams. Any communication breakdown can take a huge fee off the workload, leading to a whole new challenge to figure out. While communicating is the initial challenge.

Ultimately, communication will lead to impressive overall adoption. The communication story can be used to accomplish a variety of organizational goals like trusting each other, getting things done in a better and a simple way, and knowing what to say and when to say. With good communication channels, the team can have good support. Based on (*Sandeep's study)* there are seven (7) ways to take your team communication to the next level and achieve a happier and more productive team.

1. Having one-on-one interactions

Successful teams are made of team members who are purposeful in their interactions. One on one interactions is important with every individual you hire to make sure employee engagement doesn't fall short in your workplace. During these interactions, set your expectations and needs. Tell them about what your project demands, what are the norms of your company for employees, and give them adequate preparation time to maximize their potential. When having one-on-one interactions, make sure you know when to listen to what your employees have to say. The leaders need to put their best foot forward for their new hires to get to the bottom of things.

2. **Encourage two-way feedback**

Encouraging two-way feedback is a sign of good communication in the workplace that will give your team a chance to self-evaluate. Give detailed feedback to increase team communication and to coach your team members. You can keep a written record of feedback via your task management system which can help increase overall communication and productivity

3**. Show Appreciation**

This is a method to promote communication in the team. Given a token of appreciation to your team members by congratulating them for great ideas, thanking a team member to finish a task and express gratitude even for small acts.

4. **Conduct team-building activities**

Team building activities have a great impact on productivity and overall teamwork of your team. It can help your people to communicate better, and also help them to build good relationships with one another. Create structural opportunities for your employees to collaborate through activities like team lunches, ice breaker games in meetings, group meetings, fitness sessions, puzzle-solving games, or any outdoor activity.

5. Use time wisely

Team bonding is a better way to improve communication channels. Coffee breaks are an ideal opportunity for informal meetings and discussions. It encourages healthy communications amongst colleagues and also promotes the exchange of ideas. Let your team members have coffee breaks at the same time to create an ideal environment for team members to relax and discuss issues.

6. **Promote communication and collaboration**

Encouraging collaboration will promote diverse skills to make sure everyone is aware of ongoing projects. Leaders can get their people to talk, to share ideas to complete the project. Employees should be given opportunities to ask questions, ask for help when they need it and use tools to collect information, feedback, and updates.

7. Use the appropriate platform of communication

Every project needs an effective communication stream to reflect the progress of the project. The modern workplace is on its way to digital transformation. So, you need to invest in key systems and applications for productivity and communication. According to the needs of your project, communication tools can be an effective way for the whole team to meet up. With task management software, you can streamline communication between your team members.

2.4 Conceptual Framework

Based on (camp, 2001) statement conceptual framework is a structure that the researcher believes can best explain the natural progression of the phenomena. It links with the concepts, empirical researches, and important theories used in encouraging the knowledge adopted by the researcher (Peshkin, 1993). The conceptual framework presents an integrated way of looking at a problem under study (Liehr & smith, 1999). Warehouse location design, inventory location, warehouse management system utilization, and effective information sharing will determine warehouse efficiency.

According to the (Damotech Marketing August 22, 2019) research result efficiency can focus on your shipping or receiving area and the workers in that department tracking the total number of items shipped versus your projected numbers, on-time deliveries, an order's cycle time or lead time, the accuracy of orders and order rate of returns.

Based on (management study, guide.com) supply chain efficiencies depend upon the efficiency of logistics including transportation and warehousing operations. Warehouse efficiencies depend on a combination of warehouse design, layout, infrastructure, systems, Process, and people.

In this research, the conceptual framework describes the relationship between the independent variables i.e. warehouse layout design, inventory location, warehouse management system, and effective communication with the dependent variable warehouse efficiency that had developed and argued against the related research's empirical result.

An effective warehouse layout means the proper set-up (location) of the warehouse either in the "U" shape or "I" shape of a warehouse for the day-to-day operations. It should design the layout of the warehouse to accommodate fleet parking and enable containers (trucks) to drive in and drive out easily. Any time two containers should be able to pass through on the path without any interruption. There should be enough free space for vehicles to maneuver. The layout should also provide for other utility, safety, and security operations. Internal layout design built taking into account the operational process, nature of goods, volumes of transactions both inbound and outbound, storage types, in-house operations involving put away and pull sequences and process requirements including packing, kitting, etc. and the availability of floor space coupled with building layout design of

inbound and outbound docks. The layout aims to maximize space utilization, minimize the MHE movement, and manpower movement.

The warehouse management system refers to a computer information system of preparation, monitoring, and execution of warehouse activities. In today's competitive market, the use of ICT has become a powerful tool driving the success of any organization's supply chains. This transformed the role of warehousing for the companies to customize their value proposition and increase the levels of their customer satisfaction. The warehouse management software consents to the optimization of operation of the warehouse, a perfect stock assessment, optimization of transportation costs, the disappearance of errors in preparation, adaptation of the work required.

Finally, effective communication (information sharing) means the flow of pieces of information from top to bottom, from bottom to top or horizontal communication to manage and administer the warehouse activities at optimum level and creation of a positive working culture.

The Heineken brewery kilinto directly affects branch warehouse efficiency is directly through warehouse layout problems, improper inventory locations, lack or non-utilization of warehouse management systems, and lack of effective communication between the teams.

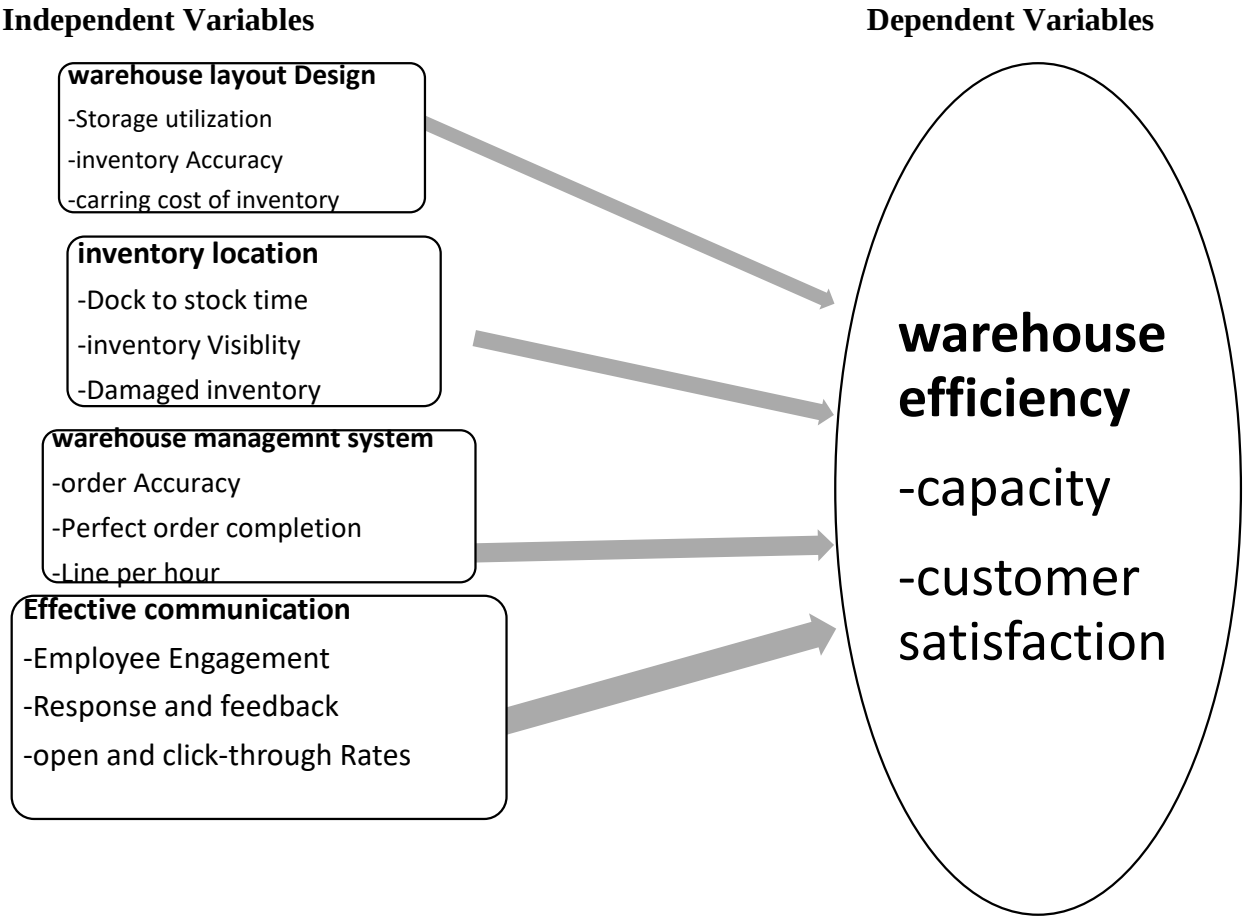

FIGURE 1 RELATIONSHIP BETWEEN VARIABLES (OWN MODEL) **(A MODIFIED ADOPTION FROM ARONOVICH, DANA, MARIE TIEN, ETHAN COLLINS, ADRIANO SOMME LATTE, AND LINDA ALANI. 2010.**

2.5 Warehouse Efficiency Metrics

According to the WERC 2016 DC measuring reports the top 5 metrics that mattered most to respondents were:

1. On-Time Shipments (Customers)
2. Average Warehouse Capacity Used (Capacity)
3. Order Picking Accuracy (Quality)
4. Dock-To-Dock Cycle Time in Hours (Operations)
5. Internal Order Cycle Time in Hours (Customer)

Warehouse performance measurement needs to improve the performance of the logistics system. To improve warehouse performance, it is necessary to identify the Key Performance Indicator (KPI). Different warehouses have different KPIs therefore this

research aims to identify the most important KPIs of the warehouse that the warehouse manager can take corrective actions for further warehouse efficiency improvement.

Warehouse performance indicators extracted and classified as direct or indirect measures. It usually expresses that direct indicators are in simple mathematical expressions while indirect indicators consist most times of a concept measure. They do not use these concept measures for daily management since they require a significant quantity of data, which are sometimes difficult to get. As a result, direct indicators continue to be the basis for warehouse performance measurement.

There is only a limited amount of space in your warehouse and you will need to ensure that you are making the best use of this space to make the highest profit. The research links the business profit to the efficiency of your warehouse, so analyzing these key efficiency factors is a very decisive point for company productivity.

There are unique methods for classifying warehouse efficiency measures. Based on traditional logistics warehouse performance measurement categories into “soft” and “Hard” metrics. For this research, capacity measures warehouse performance (space utilization) of the space and customer satisfaction.

Measuring the space utilization means knowing the ratios for the whole warehouse area coverage that assigned to the item for stacking to the whole warehouse area. This is an allegorical and clear sign of the status of warehouse efficiency in quantitative data.

Measuring warehouse efficiency by customer satisfaction is the perception of responsible persons over customer satisfaction and loyalty.

Finally, effective communication (information sharing) means the flow of pieces of information from top to bottom, from bottom to top or horizontal communication to manage and administer the warehouse activities at optimum level and the creation of a positive working culture. In general, in Heineken brewery kilinto branch warehouse efficiency is directly affected through warehouse layout problem, improper inventory

2.6 Identified Literature Gaps

In all the above studies, different researchers conducted their studies on warehouse efficiency from different perspectives such as the effect of warehouse management on

organization performance, the effect of warehouse management on financial performance, and assessment of warehouse management practice. This shows how warehouse management is the key part of the management functions to perform effectively and efficiently for any organization.

There is a lot of researches done on warehouse efficiency and warehouse management in different problem areas but most of them were done in business firms focusing on organizational performance and financial performance. There is no research concerning on logistics performance on nonprofit organization. The objective of warehouse management is an effective, efficient, and economical supply of the produced satisfied environment. Most previous research and journals have focused on measurements of warehouse efficiency and operational performance rather than identifying the factors of warehouse efficiency. This research goes to identify the determinant for warehouse efficiency and the level of determinacy for warehouse efficiency.

CHAPTER THREE: RESEARCH METHODOLOGY

INTRODUCTION

This chapter presents the research design, research approach, targeted population, sample size determination, method of data collection, and ways of primary data, secondary data collection, and analysis. The study utilized a descriptive and explanatory research method to identify factors that had been mainly determined considered as problems in warehouse efficiency.

3.1. Research approach and Design

3.1.1 Research Approach

The approach of this study combines both qualitative and quantitative research approaches (Mixed approach) to conduct effective and efficient data collection, interpretation, and analysis. The qualitative approach enables the collection of data in the form of words rather than numbers and answers open-ended questions in the instruments that means the researcher enables the description of the actual phenomena deeply and comprehensively.

Based on (Kothari, 2011). Qualitative methods can be used to gain more in-depth information that may be difficult to convey quantitatively. The quantitative approach goings-on for precision by focusing on items that can count in predetermined categories and subjected to statistical analysis (Taylor, 2013). The use of these two approaches re-enforces each other (Zhu et al, 2013). Among the above-mentioned reasons and nature of research, the researcher prefers to use this approach because the data collected through own developed questionnaires in the quantitative base and analyzed using different statistical methods. Qualitative, on the other hand, involves interpretation of phenomena without depending on numerical measurement or statistical methods (Styles et al, 2012).

Most of the time much researchers and scholars argued that the best method to use for a study depends on the objectives of the research, the researcher's background, and the prepared research questions. This idea is more convenient and has a governing power to conduct one research fully. According to (Kothari, 2004) a mixed research method defined as the class of research welfare the researcher mixes or combines qualitative and

quantitative research techniques, methods, approaches, concepts, or languages into a single study.

On the other side using a mixed approach used to triangulate and support the data and result collected through questioners (Greener, 2008 and Saunders et.al, 2007) By considering the benefits of mixed research approach the researcher had decided to use this approach for analyzing internal warehouse layouts, inventory location, warehouse management system utilization, and effective communication over warehouse efficiencies broadly and concisely.

3.1.2 Research Design

Based on (Johan A.H. et al., 2007) the research design is a blueprint for fulfilling research objectives and answering research questions. Research designs are a specific outline that describes how your selected technique applies to answer a research question and introduces what it does in what time frame and tells us how the goal of a research project accomplished. (Creswell, 2003) a majorly descriptive study is a suitable method for survey problems. According to (Tayie, 2005, p. 50) a descriptive survey attempts to picture out or document current conditions or attitudes to describe what exists at the moment. As described by the above two scholars, a descriptive survey method is convenient to show the broad description of the existing factors that determine the warehouse efficiency of any manufacturing company.

Therefore, to conduct this research the researcher used a descriptive and explanatory type of research to examine and describe and explore the determinant of warehouse efficiency for Heineken brewery kilinto site warehousing activity. The descriptive research design used to describe the independent and dependent variables of warehouse efficiency. Besides the survey, the descriptive research design uses observations and case studies for detailed data analysis that the company observed as a limitation. This research describes and assesses the determinant of warehouse efficiency for kilinto Heineken brewery. Simultaneously, this study used close-ended questionnaires' to complete research objectives. The researcher analyzed the collected data using statistical packages for social sciences (SPSS) as a tool for descriptive, correlation, and regression data analysis.

3.2 Research Population and sampling

3.2.1 Population Size

The population of one study is the collection of elements that have the same characteristics in common. Several elements in the population are the size of the studied population. This research assesses and describes the critical factors that determine warehouse efficiency in warehousing activity for the Heineken Ethiopia kilinto branch. Thus, the population of this study focused on the supply chain function, permanent employees of the warehouse and transport department, partial packaging employees, and partial supply chain and logistics director employees from the central office.

The company has 399 (Three hundred ninety-nine) permanent employees within the selected departments, but the focus of this study inclines to the warehouse and transport managers, warehouse and transport assistant managers, warehouse team leaders, warehouse coordinators, RPM OPCO. Controllers, FLT operators, and packaging team leaders of the company. Even though the employees in these departments have assumed to have a better understanding of the area of this study, the sample of the study taken from these listed job positions. The total population on these job positions are 80 (eighty employees). The researcher used these populations to collect data by determining sample size through different sampling methods and sampling techniques.

3.2.2 Sampling Design

Sampling is a method that allows researchers to infer information about a population based on results from a subset of the population, without having to investigate everyone. Reducing the number of samples in a study reduces the cost and workload, and may make it easier to get high-quality information, but this has balances against having a large enough sample size with enough power to. There are different sampling techniques available to control the sample of the study, for this research the researcher considers the entire population in the study by conducting census survey rather than sampling from the population and for some extent probability sampling methods through stratified sampling techniques combined with the non-probability method judgment (or purposive) sampling techniques to infer the source of information about warehouse efficiency methods. Thus, the sample of this research should have equal to the populations that the researcher determines on the population size.

3.2.3 Sample Size

According to (Kothari, 2004) determining sample size varies for uncommon types of research design and approaches'. A general rule, one can say that the sample must be of an optimum size it has to neither be excessive nor too small (inadequate). Based on Tamirat Jaleta (2019) cited (Lewis and Thornhill 2012) state that the likely response rate shall be reasonable 50% or moderately higher, while (Patrick, B. 2003) referring (Babe 1979), the return or success rate 50% are 'adequate' 60% response rate is 'good' and 70% or higher is 'very good'. Taking this experience for this research purpose, confidence in successfully collect or return rate expected to be >70%, and the remaining may have defected or non-response and sampling size determined at a 95% confidence level.

For this research, the researcher used all populations as a sample because the total population is less than 100 (one hundred) which is 80(eighty) in numbers through the census survey. To determine the sample the researcher bases on the suggestion of (Israel, 2013) that if the target population is smaller (e.g. 100 or less) census survey is the most appropriate and effective method to achieve a desirable level of precision.

3.3 Data source and type

To achieve the objectives of the study, both primary and secondary sources of data were used to gather relevant information. Secondary data collected from original materials like writing documents for the organization, annual reports, manuals, and websites of the company. The researchers collected primary data from respondents through semi-structured, formal questionnaires, researchers developed that, and on-site visits to the warehouse. To collect the primary data, the questioners prepared in the English language since the respondents expected to have a satisfactory understanding of language and are professionals.

3.4 Methods of Data Collection

The researcher collected the primary data for this research through self-designed questions as a tool. The researchers designed and distributed a self-designed semi-structured questionnaire used for data collection for all variables under study and used this self-designed semi-structured questionnaire a primary data collected from respondents who have a direct relation to the issue under study (production and logistics) that nominated for

the direct information provided (informative) through a survey and observational data collection.

Whereas, secondary data collected from different research articles, research booklets, published journals, published magazines related to warehouse efficiency and space utilization, company annual magazines, the company working standard manuals, different external and internal warehouse assessment reports, news of the brewery and different websites. The data sources for this research study are from one function and two departments.

3.5 Data Analysis and Interpretation Method

For this study, both qualitative and quantitative methods were functioned to analyze. The aim of the qualitative approach used to describe the determinate factors in warehouse efficiency in outbound and inbound warehousing activities of Heineken brewery and to test the relationship between demographic variables and factors affecting warehouse efficiency. To survey the effects of warehouse layout, inventory location, warehouse management system, and effective communication on warehouse efficiency, the Statistical Package for Social Science (SPSS) version 23 software is the analytical technique of choice.

The value of alpha 0.05 is used for significant test analysis. Pearson coefficient of correlation analysis carried out on the data got from the respondents to examine the relationship between the independent and dependent variables, and multiple regression is used to examine the four combined effects of the independent variable on warehouse efficiency. A correlation score of -1.00 means that there is a perfect negative association between the two variables while a correlation score of 1.00 means that there is a perfect positive association between the two variables. A correlation score of 0.00 means that there is no relationship between the two variables (Gravetter and Wallnau, 2000).

Meanwhile, the researchers used appropriate analytical techniques such as descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential statics (correlation, regression & F-test). Gravetter and Wallnau (2000: 531) define the Pearson correlation as measuring the degree and direction of linear relationships between two variables. According to Duncan C. And Dennis H. (2004:38-41), the correlation coefficient

can range from -1 to +1. The value of -1 represents a perfect negative correlation, while a value of +1 represents a perfect positive correlation. The value of 0 correlations represents no relationship. It interprets the results of the correlation coefficient as follows

Correlation Coefficient	**Interpretation**	
(-1.00 to -0.8]	Strong	Negative
(-0.8 to -0.6]	Substantial	
(-0.6 to -0.4]	Medium negative	
(-0.4 to -0.2]	Low	
(-0.2 to 0.2)	Very Low	Positive
(0.2 to 0.4)	Low	
(0.4 to 0.6)	Medium positive	
(0.6 to 0.8)	Substantial	
(0.8 to 1.00)	Strong	

Source; Adapted from Duncan c.Dennis H.

The second aspect to examine the relationship between variables multiple regression involves the specification of the form of the relationships to find a mathematical expression that enables us to predict the score of one variable (called dependent variable) from knowing the score of the other variables (called independent variables).

According to (Cooper and Schindler, 2001) multiple regression analysis is a statistical analysis technique used to establish the linear relationship between a single dependent variable and two or more independent (explanatory) variables and is used to test the proposed hypotheses. It provides an index of relationship (1 = perfect relationship, 0 = no relationship) between the criterion variable (s), on the one hand, and the weighted combination of the predictor variables as specified by the regression equation that is, R (Hair et al., 2006).

Regression analysis predicts changes in a dependent variable by accounting for the impact of various independent variables via their weighted combination. Interpreting the results of regression analysis tested by examining the R-squared (R2) statistic, which shows the proportion of variance in the dependent the weighted shares variable that primarily uses Regression analysis is primarily for two conceptually distinct purposes. First, their widely used regression analysis used for prediction and forecasting, where it uses substantial overlap with the field of machine learning. Second, in some situations, regression analysis can infer causal relationships between the independent and dependent variables.

Importantly, regressions by themselves only tell relationships between a dependent variable and a collection of independent variables in a fixed data set. To use regressions for prediction or to infer causal relationships, respectively, a researcher must carefully justify why existing relationships have predictive power for a new context or why a relationship between two variables has a causal interpretation.

The regression analysis used the F-statistics to measure the predictors (effective warehouse layout, inventory location, warehouse management systems, and efficient communications) effect on the dependent variables (warehouse efficiency). Each F statistic is a ratio of mean squares. The numerator is the mean square for the term. The denominator chose such that the expected value of the numerator means square differs from the expected value of the denominator mean square only by the effect of interest.

The effect of a random term represents the variance component of the term. The effect of a fixed-term represented by the sum of squares of the model components associated with that term divided by its degrees of freedom. (Hirschey, 1995:181) states that if the high value of the F statistic shows a more significant effect.

The model to be used in the study takes the form below:

$$\mathbf{Y = \alpha + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \mathcal{E}}$$

Where;

Y= the dependent variable (warehouse efficiency)

α- Is the intercept term- constant which would be equal to the mean if all slope coefficients are 0.

β1, β2, β3, and β4 – are constant regression coefficients representing the condition of the independent variables to the dependent variables.

X1- warehouse layout, X2-inventory location, X3-warehouse management systems, and X4-effective communication.

Ɛ - (Extraneous) Error term.

3.6 scale reliability and Validity

3.6.1 Reliability

Reliability has to do with the quality of measurement. Reliability is the consistency, repeatability, or dependability of the research instruments that your measures. A measure is considered reliable if it would give the same result over and over again (assuming that what is being measured is not changed). Reliability suggests that the same thing is repeated or returns under identical or very similar conditions (test-retest).

According to (Cohen and Sayag, 2010, Field, 2009) to carry out the reliability analysis, Cronbach alpha (α) was used. It is the most common measure of scale reliability and has a value greater than 0.700 is considered very acceptable. The accepted limit of Cronbach's (α) is 0.700 based on this for this research the values of all variables should have more than 0.700 based on this result the researcher proceed for further analysis by using the scale. Based on (Hailu kibrom, 2019,) statement Cronbach's alpha value of 0.7 or higher is a reasonable test of scale reliability. The higher alpha value indicates a more reliable and higher consistency of the measurable items under the same hidden construct.

TABLE3.1 RELIABILITY STATISTICS

Dimensions	Cronbach's alpha	No-of items
Dependent variable		
Warehouse efficiency	.703	9
Independent variables		
Warehouse layout	.784	6
Inventory location	.778	8
Warehouse management systems	.752	6
Effective communication	.730	6

Source own survey

3.6.2 Validity

Before the major data collection, the researcher did piloting. The pilot test aimed to solve ambiguity (clarity, language, translation, and structural problems) on semi-structured questionnaires and to check the validity, reliability, and feasibility of the instruments that the researcher developed to collect data from respondents. Two experts selected from two departments and given the English versions of the developed instruments to check the validity. The selection of the experts based on their knowledge of warehousing activity and the relation of their work with the research topic. The experts recommended wording and language on the items and incorporated accordingly. Paradigm validity is assured by structuring the questioner according to the specific objectives.

3.7 Ethical consideration

Several ethical considerations were considered throughout the study. Even if the researcher is a company employee before starting the formal data collection the researcher announced to research determinant for warehouse efficiency for the brewery manager and warehouse and transport manager officially. They gave the approvals to proceed with the research by keeping the confidentiality of the company. Respondents were made fully aware of the nature and purpose of this study and their participation was voluntarily given and treated with respect. Privacy and confidentiality of respondents were ensured by coding data so

that identifying pieces of information are eliminated under this research. In addition to the above reference works of other researchers and authors are cited appropriately and full acknowledgment and confidentiality have been made of the ideas, writings, and drawings of others or quoted items for the provided instruments. Through considering the research ethics respondents' were given adequate information regarding the purpose of the study and were expressing their constructive ideas and comments verbally.

CHAPTER FOUR: RESULT, DISCUSSIONS, AND INTERPRETATION

INTRODUCTION

Under this chapter, the analysis and interpretation are carried out based on the data collected through questionnaires from one function (Supply chain management) and two departments (warehouse& transport and production) which work along the line of warehousing activities. The data collected through questioner analyzed using the Statistical Package for Social Science (SPSS v. 23).

Based on the methodologies, research design, and tools of the proposal the data was collected from 80 respondents. From the total 80 distributed questionnaires 74 returned, from which 6 were not returned. Therefore 74 were effectively used for analysis that shows a response rate of 93.75% of total respondents. This is a good response rate based on Fowler (2002) a 75 percent response rate considered adequate. Most of the measurement items measured in five-point Likert-scale types ranging from 1-strongly disagree to 5-strongly agree.

Data analysis, discussion, and interpretation of the results had presented in the following sub-headings response rate, demographic data presentation, analysis of descriptive statistics, Interpretation of correlation, and regression coefficient. The analysis of the study was structured and conducted to answer questions by addressing the objective and research questions of the research.

4.1 Background of the organization

Heineken entered the Ethiopian beer market in August 2011 after acquiring Bedele and Harar breweries from the Privatization & Public Enterprise Supervising Agency (PPESA). The breweries which were purchased for a total of $163,400,000.00 (one hundred sixty-three million four hundred thousand dollars) with a production capacity of 750,000hl (seven hundred fifty thousand hectoliters) a year.

When the company handed over the Bedele Brewery had three brands; Bedele, Bedele Special, and Bedele Choice with an annual production capacity of 300,000hl (three hundred thousand hectoliters). Heineken's other acquisition Harar Brewery has a capacity

of 450,000hl (four hundred fifty thousand) a year under three brands; Harar, Hakim Stout, and Harar Sofi (malt).

Aspiring in the Ethiopian beer market the Dutch brewing giant, Heineken, is building an Ethiopia's biggest brewing plant in the Akaki kality District, one kilometer of the Kality Correctional Facility. Within a short period, the company had inaugurated the Greenfield in 2014 by giving its brand 'Walia Beer'. When the Greenfield inaugurates the total production capacity becomes 1.5 million hectoliters per annum by investing $ 149.5 million (one hundred forty-nine point five million dollars).

HEINEKEN Ethiopian has invested USD 145,980,000.00 (one hundred forty-five million nine hundred eighty thousand dollars) in an expansion project at its plant kilinto site that had been inaugurated in September 2018 to increase its production capacity by a third of its previous output. The project, which is accomplished within 14 (fourteen) months came after HEINEKEN received USD 46,370,000.00 (forty-six million three hundred seventy thousand dollars) of letter-of-credit facilitation from the government in 2018 physical year to undertake the expansion. The expansion increases the annual production capacity of beer by Heineken's Ethiopian wing at the kilinto plant to 4.5 million hectoliters annually, bringing its overall capacity to 5.5 million hectoliters a year. Other new developments include expansion of its bottling lines, brewing houses, and fermentation and storage tanks as well as raising the number of employees from 100 to 1,000.

The bottling lines were supplied by the German company Krones Group while the Chinese firm Lehui Group delivered the fermentation and storage tanks. This is its second investment at the plant after inaugurating its one-year expansion project executed at a total cost of US$86. 82 million in 2016, giving the company the highest production capacity in Ethiopia's brewery industry.

The Greenfield brewing company produces Walia, Bedele, and Harar products for the first time. At this time, the brewery can produce more than 9 (nine) different alcoholic beer brands, three non-alcoholic beer brands, and two draft brands. From the perspective of employments, currently, the brewery has more than 445 (four hundred forty-five) permanent and 430 (Four hundred thirty) temporary and sub-contract employees in different functions.

After consecutive expansions, the company introduced its flagship brand, Heineken Beer and it also produces Buckler and Sofi beers. (Annual company human resource master data, November 25, 2019) and Addis fortune news May, 2013& September 2018.

4.2 Response Rate

A total of 80 questionnaires was distributed to employees of warehouse and packaging to gather the primary data through semi-structured questionnaires. Out of 80 questioner's 74 respondents returned by filling the questioners that account for 91.25%, but from these 4 questioners were not properly fulfilled the required information and contains 5% of the whole sample values. In the case of annual leave and COVID-19, 6 respondents had not returned the distributed questionnaires which contain 6.25% from the total distributed questioners.

Based on the collected data and returned questioners 70 respondents fill the questioner without any gap which contains 94.59% and the remaining 4 respondents had not properly marked the questioners which contain 5.41% of the returned questionnaires. From the total distributed questioners researcher can collect full information contains 87.5% and 12.5% had not returned to the researcher with full information in case of annual leave and COVID-19. Out of the returned 4 questioners had not full information and discarded by the researcher.

Table 4.1 summary of response rate

Description	Number of respondents'	Respondent's in (%)
Distributed questioners	80	100
Returned questioners	74	92.5
Questioners not returned	6	7.5
Questioners returned incompletely	4	5.0
used for analysis	70	87.5

Source, own model for research, 2020

4.3 Background of Respondent

The background of the respondent includes age, educational level, sex, current positions, and work experience within the company.

Table 4.2 Background static's of the respondent

Variables		Frequency	Value (%)
Age	20-28 year's	16	22.9
	29-35 year's	23	32.9
	36-45 year's	30	42.9
	>45 year's	1	1.4
Gender	Male	58	82.9
	Female	12	17.1
Education	college diploma	1	1.4
	Advanced Diploma	8	11.4
	Degree(BSC,BA)	52	74.3
	Second Degree(MS,MA)	9	12.9
	Ph.D. and above	0	0
Position	Mangers	1	1.4
	Assistant Managers	8	11.4
	Team leader	19	27.1
	Controllers	1	1.4
	Coordinators	28	40
	RPM planners	2	2.9
	Admin assistance	8	11.4
	FLT operator	3	4.3
Year of service	1 year	3	4.3
	2-3 year's	20	28.6
	4-5 years	17	24.3
	6-10 years	30	42.9

Source; - survey results from 2020

As it indicated in the above table 29 (40%) of the respondents are coordinators, 19(27.1%) of them are Team leaders, 8 (11.4%) of them are admin assistances, 1(1.4%) of the total respondent is controller, 2(2.9%) of them are RPM planners, 3 (4.3%) of them are FLT operators, 8 (11.4%) of them are assistance managers and 1(1.4%) of them is the manager. This implies that there were enough and fair participation from each job category that used the researcher to triangulate the responses collected by different data collecting instruments.

As the researcher depicts on the above table concerning respondents' work experience, the majority of Heineken employees which contain 30 (42.9%) are matured and have between 6 and 10 years' service years. It implies that the employees of the selected respondents have good knowledge of activities, rules, and regulations of the company and country. The remaining of 57.1 % respondents have 17(24.3%) of the total respondents served 4-5 years, 20(28.6%) of them served 2-3 years and the rest 3(4.3%) of them served 1years respectively. The majority of the respondents served more than two years. This implies that the majority of the respondents have a good knowledge of warehouse efficiency and a better understanding of the research questions and objectives.

From the perspective of respondents' educational background as it is shown in the above table high level of education was sought. This was necessary to deduce the respondent's aptitude and knowledge in providing meaningful responses to the researcher instruments. The findings on the highest level of education 1 (1.4%) of the respondent are college diploma, 8 (11.4%) of them are Advanced college diploma, 52 (74.3%) of them have a first degree and the rest 9 (12.9) of them have Master's degree. The majority of the respondents taken formal education and certified in different disciplines. This implies that they were fit to give a relevant response to the research questions based on formal knowledge and skill without any language barriers.

In general, the demographic data shows that to conduct this research respondents are qualified and give constructive ideas to improve warehouse efficiency and identify the basic warehouse efficiency determinant in their company from different perspectives. As it was indicated in the above table 29 (40%) of the respondents are coordinators, 19(27.1%) of them are Team leaders, 8 (11.4%) of them are admin assistances, 1(1.4%) of the total

respondent is controller, 2(2.9%) of them are RPM planners, 3 (4.3%) of them are FLT operators, 8 (11.4%) of them are assistance managers and 1(1.4%) of them is the manager. This implies that there was enough and fair participation from each job category that used, the researcher to triangulate the responses collected by different data collecting instruments.

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4.4 Descriptive statics interpretation

Descriptive statistics were assessed to examine the mean scores and corresponding standard deviations under the respective scales of each measurement item. So, this particular attempt has the importance of answering some of the research questions based

on the perceptions of the respondents on the level of warehouse efficiency of their company and also to answer on which key efficiency indicators that the company performs better.

Accordingly, the mean scores computed for all the four warehouse efficiency determinant warehouse location design, inventory location, warehouse management system and effective communication, and also the dependent variable warehouse efficiency by equally weighting the mean scores of all the items under each dimension. The average mean result of each independent and dependent variable presented, analyzed, and interpreted as follows.

In the descriptive analysis, mean and standard deviations were used to identify the affecting levels of independent variables on the dependent variables. Whereas, interpretation of the result of mean and standard deviation, the scales were reassigned as follows to interpret easily and clearly for the readers and coming scholars.

Table 4.3 guideline for interpreting quantitative Data

Range	Interpretation -1	Interpretation -2
1-1.8	Strongly disagree	Very dissatisfied
1.81-2.59	Disagree	Dissatisfied
2.61-3.49	Neutral	Moderate satisfied
3.5-4.9	Agree	Satisfied
5.00	Strongly Agree	Very satisfied

Source;-Adopted kibrom Hailu & (Best, 1977)

4.4.1 Level of warehouse layout Design

Table 4.4 Mean and standard deviation of warehouse layout design

Item Description	N	Mean	Std. Dv
My company's warehouse location is near to the central market and has a positive advantage for market expansion.	70	4	0.816
The company's warehouse location design standard fulfills the global settled warehousing standards	70	3.49	0.864
In our warehouse, there are designed (specific) areas that we accumulate sub-standard, the customer complained return, and outdated full products and RPMs.	70	3.84	0.694
Our warehouse layout accommodates efficient fleet parking and enables drive in and out easily	70	3.49	0.717
Our warehouse location design considers the flow of inventory(i.e. doesn't concern with the controlled and uninterrupted movement of materials, peoples, and traffic)	70	3.73	0.7
cumulative value		3.709	0.5571

Source; - SPSS output (2020)

From the findings, most of the respondents agreed companies warehouse location proximity to market take advantage for the competitors market share and market expansion advantage(M=4, SD=.816) and from the positive side the warehouse location design of Heineken Ethiopia fulfilled the international warehouse standard's that the value indicates (M=3.49, SD=0.864), from the perspective of efficient fleet parking accommodation the Heineken's warehouse location design become satisfactory, most of respondent's agreed on the stated item for measurement (M=3.49, SD= 0.717), from the perspective of specific place designation for any quarantined material accommodation the company had well trained which is scored(M=3.84, SD=0.694). Items that put on warehouse location, design consider the flow of inventory to measure the warehouse location design most respondents agreed (M= 3.73, SD=0.700) which means the internal warehouse design considered the flow of warehousing activities.

In general, the warehouse location design, measurement result shows that the Heineken warehouse location design is satisfactory on the respondent's evaluation, the cumulative result shows that (M=3.709, SD=0.5571). Among the analyzed result, warehouse location design determines the warehouse efficiency by directly affecting the warehouse efficiency.

Two recent publications by Grosse et al. (2015) and Grosses, Glock, and Neumann (2017) focused on warehouse design and management every warehousing activity are determined by warehouse design. The conclusion of this paper shows that warehouse design determines the warehouse efficiency argued with the above-mentioned researcher's results.

4.4.2 Level of Inventory Location

Table 4.5 mean and standard deviation of inventory location

Item description	No	Mean	Std. Dev'
Most of the time, our warehouse has enough space to move goods/workers/types of machinery during inventory location activities	70	3.66	0.679
In outbound and inbound warehouse, goods and items are placed in the correct location	70	3.83	0.68
warehouse personnel are skilled to perform inventory location activities	70	3.89	0.826
In our warehouse, there are adequate facilities for inventory location activities	70	3.29	0.854
Too much warehouse space is occupied by ideal & obsolete inventory items	70	3.77	0.765
All inventory items are categorized by ABC classification's	70	3.76	0.669
There is seasonality in demands for available inventories	70	3.37	0.783
HEINEKEN warehouse personnel are skilled to perform put away activities	70	3.66	0.679
cumulative value		3.67	0.466

Source; - SPSS output (2020)

From the findings, most of the respondents agreed warehouse personnel is skilled to perform inventory location activity based on the seated manuals and working procedures (M=3.89, SD=.826) and the employees of Heineken are more skilled to perform the put-away activities of inventory(M=3.66, SD=0.679) within a warehouse to increases the warehouse efficiency. From the point of inventory location parameters, goods and items in the inbound and outbound warehouse are put in the correct place, but most of the warehouse spaces are occupied by obsolete items and all inventories are tried to seated on ABC classification are valued(M=3.83; SD=0.680),(M=3.77; SD=0.765) and (M=3.76; SD=0.669) respectively. The result implies that most respondents positively recommend Heineken's inventory location procedures and applications. Respondents are satisfied by

the provided questioners to evaluate warehouse efficiency for future improvements. From the perspective of availability of the adequate facility for inventory location and seasonality of inventory, most respondents respond neutrally. The value shows (M=3.29; SD=0.854 and M=3.37; SD=0.78) respectively.

From the overall analysis, the inventory location determines the warehouse efficiency by the value of (M=3.67; SD=0.466). This implies that the respondents agree on the instruments of the inventory location.

4.4.3 Level of Warehouse Management Systems

Table 4.6 Mean and Standard Deviation of warehouse management systems

Description	N	Mean	Std. Dev
We are using the necessary digital materials for warehouse management purposes	70	3.66	0.883
We are successful in minimizing total product damage in the Warehouse-like product deterioration, breakage, leakage, through technology-based materials.	70	4.11	0.692
WMS Improves warehouse flexibility and responsibility	70	4	0.742
WMS improves warehouse safety and security	70	2.46	1.003
We have a clear platform and have enough materials for WMS implementation in every warehousing activity	70	3.83	0.701
WMS improves the picking accuracy of full and empty items within a warehouse	70	3.8	0.672
WMS improves customer service levels	70	2.79	0.778
Grand value)		3.52	0.501

Source; - SPSS output (2020)

As depicted on table 4.6 warehouse management system enforces positively the warehouse efficiency by the value of (M=3.52; SD=0.501). Most of the respondents are agreed on the listed parameterizes of warehouse management systems means that the grand value shows that the warehouse management system is a satisfactory value on warehouse efficiency. When we see individually most of the respondents for the effect of warehouse management system on minimization of product damage and increasing the warehouse flexibility and responsibility agreed for the parametrizes (M=4.11; SD=0.692 and M=4; SD=0.742) respectively, which implies applying warehouse management system directly improve the warehouse efficiency. On the other side the warehouse management system for the

customer service level improvement most respondent's ranked on neutral (M=2.69; SD=0.778).

The result implies that WMS sometimes improves the customer service level or in some cases, it doesn't work

4.4.4 Level of Effective Communication

Table 4.7 Mean and standard deviation of effective communication

Description	N	Mean	Std. Dev
Most of a time the company uses appropriate platforms for communications	70	3.83	0.68
In Heineken, communication build relationships & trusts between colleagues	70	3.89	0.826
The company have regular one on one discussions for employees gap filling	70	3.29	0.854
Most of a time the company encourages the two-way feedbacks	70	3.77	0.765
We have a regular schedule to conduct team building activities	70	3.6	0.954
In our company, we have open and clear communication platforms within suppliers, customers, and employees	70	3.66	0.679
cumulative value		3.67	0.521

Source; - SPSS output (2020)

The research questionnaire designed using 5 points Likert scale to collect appropriate responses, concerning this the respondents indicated the level they agree with the statements by choosing: 5- Strongly Agree, 4 Agree, 3-Neutral, 2-Disagree, and 1-Strongly Disagree.

Based on the response of the respondents the findings on Table 4.7, majority of effective communication indicator greater than 3.50, when we see the respondents from the perspective of descriptive statistics it indicated that the respondents agreed to the fact that effective communication is available for the warehousing activity in their respective firms, which imply the effect of communication influence warehouse efficiency of an organization.

4.4.5 Warehouse Efficiency Level

Table 4.8 Mean and standard deviation of warehouse efficiency

	Mean	Std. Dev	N
WH. location Design	3.7086	.55710	70
Invent. Location	3.6518	.46620	70
WH.magmt. system	3.5204	.50083	70
Effec. Communication	3.6714	.52088	70
WH. Efficiency	3.6762	.41087	70

Source;-SPSS output (2020)

Based on survey results, the Means of all the independent variables are 3.7086, 3.6518, 3.5204, and 3.6714 for warehouse location Design, inventory location, warehouse management system, and effective communication respectively. Inventory location has the lowest deviation, 0. 46620. So, this finding implies that warehouse efficiency highly determined by warehouse location design compared to a warehouse management system, and effective communication within the company.

The result of this research result level of warehouse location design in the organization is substantially consistent with the results of the (Uwamahoro, 2018) that all the independent variables are with high mean values. This implied to us that as there is indirect proportionality between mean values and significance level since independent variables with high mean are producing an insignificant level.

4.5 Inferential Analysis

4.5.1 Inferential Statistics

4.5.1.1 Pearson’s correlation

In research investigation, we are expected to understand concepts beyond the mean and standard deviation of dependent and independent variables to know how one variable is related to another which means correlation. This study was interested in establishing if there a relationship between warehouse layout design, inventory location, warehouse management systems, and effective communications and warehouse efficiency i.e. To see if they are correlated or not.

The previous descriptive analysis showed the extent (level) of independent variables for warehouse efficiency in Heineken's warehousing activity. In this part, Pearson’s correlation

is used to identify the direction type and value of correlation (positive or negative) by considering the predictor variables (warehouse layout, inventory location, warehouse management systems, and effective communication) that were strongly or weakly correlated with the dependent variable (warehouse efficiency).

Based on (Beech, 2006) Clear statement that Pearson's Product-Moment Correlation is the best-known correlation and the most used for interval data. To develop the Pearson's correlation matrix, the means of the variables were calculated and grouped into five quadrants; warehouse layout item, inventory location item, warehouse management items, effective communication items, and warehouse efficiency items. As explained by Robert B. & Richard A (2008), Pearson's correlation coefficient is denoted by r and is by design constrained as follows: $-1 \leq r \leq 1$. The decision rule is such that if $p \leq 0.05$, the test is significant, and if $p \geq 0.05$, the test is not significant. Furthermore, positive values denote positive linear correlation; negative values denote negative linear correlation, and a value of 0 denotes no linear correlation.

The interpretation of the correlation coefficient (r) size is as follows. (B. Burns & Burns, 2008), if the correlation coefficient falls between 0.10 to 0.20 it is slight correlation or small if it is between 0.20 to 0.40 is low correlation or weak relationship if it lies between 0.40 to 0.70 moderate if it falls between 0.70 to 0.90 high correlation or substantial and if it is with 0.90 to 1.00 it is very high correlation or very strong correlation between variables

Table 4.9 correlation matrix

Correlations						
		WH.location	Invent. Location	WH.magmt.sytem	Effec.commu.	WH.efficiency
WH. location	Pearson Correlation	1	0.224	0.183	0.228	.781**
	Sig. (2-tailed)		0.062	0.129	0.058	
	N	70	70	70	70	
Invent. Location	Pearson Correlation	0.224	1	0.229	.928**	.343**
	Sig. (2-tailed)	0.062		0.057		0.004
	N	70	70	70		70
WH. magmt.sysytem	Pearson Correlation	0.183	0.229	1	0.211	.243*
	Sig. (2-tailed)	0.129	0.057		0.079	0.043
	N	70	70	70	70	70
Effec. communication	Pearson Correlation	0.228	.928**	0.211	1	.320**
	Sig. (2-tailed)	0.058		0.079		0.007
	N	70		70	70	70
WH. efficiency	Pearson Correlation	.781**	.343**	.243*	.320**	1
	Sig. (2-tailed)	0.000	0.004	0.043	0.007	0.000
	N	70	70	70	70	70

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.9 shows the correlation coefficient of the four factors measuring the efficiency of the warehouse where all are positively correlated with the efficiency of the company within the range of .243 up to .781 (r=.243 to r=. 781). All are signs at both $p<0.05$ and $p<0.01$ level. When we further look at each factor with their coefficient which indicates the four independent variables: warehouse location design (r=.781), inventory location (r=.343), warehouse management system (r=.243), and effective communication (r=. 320). All are determinants of warehouse efficiency and significant to show the effect of warehouse

efficiency on one warehousing activity. Based on the matrix the warehouse location design majorly correlated with warehouse efficiency, inventory location takes the second determinant and effective communication and warehouse management system is the third and fourth-ranked determinant for warehouse efficiency respectively.

Regarding the relationship between the dependent and independent variables, all independent variables have a positive relationship with the dependent variables. Among four independent variable warehouse locations design has a very strong relationship with warehouse efficiencies, but the rest three factors have low relationships with warehouse efficiency i.e. Ranges are=0.243-0.343.

Regarding the relationship between independent variables, the above correlation table 4.9 depicts that two of the independent variables are correlated at $p<0.05$ level of significance. Effective communication has a positive relationship with inventory location and it is statistically significant with a confidence level of 95 percent. This is displayed in the table as ($r=.928$, $p<0.01$) which means there is a true or significant correlation between the two variables. The remaining independent variables have no relation between each one as we depicted in the table. The research result concludes that warehouse efficiency has a positive relationship with independent variables based on Pearson's correlation coefficient result.

4.5.2 Regression Analysis

In statically modeling, regression analysis is a set of statistical processes for estimating the level of relationship between a dependent variable (often called the 'outcome variable') and one or more independent variables (often called 'predictors', 'covariates', or 'features'). The most common form of regression analysis is linear regression, in which a researcher finds the line (or a more complex linear function) that most closely fits the data according to a specific mathematical criterion. For example, the method of ordinary least squares computes the unique line (or hyperplane) that minimizes the sum of squared distances between the true data and that line (or hyperplane). For specific mathematical reasons, this allows the researcher to estimate the conditional expectation (or population average value) of the dependent variable when the independent variables take on a given set of values. Less common forms of regression use slightly different procedures to estimate alternative location parameters (e.g., quantile regression or Necessary Condition Analysis)

or estimate the conditional expectation across a broader collection of non-linear models (e.g. nonparametric) (Wikipedia).

Table 4.10 model summary

Model	R	R square	Adjusted R Square	Std.err of the Estimate
1	. 913[a]	.833	.822	.27195

Source; - SPSS output (2020)

a. Predictors: (Constant), warehouse location design, Inventory location, warehouse management system, and effective communication.

The model summary shows that the significance and percentage of variation in warehouse efficiency, which is caused by the independent variables. Adjusted R2 implies that 82.2% of the variation in warehouse efficiency can be explained by variation in the four independent variables (warehouse location design, inventory location, warehouse management system, and effective communication) taken together. This indicates that 17.8% unexplained because there are other determining factors in the factory that affect warehouse efficiency.

Table 4.11 ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	23.937	4	5.984	80.919	.000b
	Residual	4.807	65	0.074		
	Total	28.744	69			

a. Dependent Variable: warehouse efficiency

b. Predictors: (Constant), Effect.Commun, WMS, Warehouse location design, Invent. Location

Source;-SPSS output (2020)

Table 4.11 shows the ANOVA result of multiple regression analysis. Regarding the ANOVA table, we have the F value tests whether the overall regression model is a good fit for the data. The F-value show 80.919 which is greater than the F critical and the model shows significant. The significance value of 0.000b indicates that the regression relationship is significant in predicting the effect of the determinant of independent

variables (warehouse location design, inventory location, warehouse management systems, and effective communication) on warehouse efficiency.

Table 4.13 coefficients

Model		Unstand Coef		Stand Coef's	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.508	0.311		-1.636	0.107
	Warehouse location design	1.023	0.062	0.883	16.377	0
	Invent. Location	0.188	0.09	0.199	2.091	0.04
	WMS	0.186	0.062	0.156	2.994	0.004
	Effect.commun	0.268	0.111	0.234	2.419	0.018

a. Dependent Variable: warehouse efficiency

Source;-SPSS output (2020)

As depicted in table 4.12 to analyze the determinant of warehouse efficiency, regression of warehouse efficiency was calculated. The above table shows multiple regression analysis beta coefficient and significance

The regression model was as follows

$Y=\alpha+\beta 1x1+\beta 2x2+\beta 3x3+\beta 4x4+\varepsilon$

$Y=0.883X1+0.199X2+0.156X3+.234X4-0.197$

Where; Y is warehouse efficiency

X1 is a warehouse location design

X2 is inventory location

X3 is a warehouse management system

X4 is effective communication

Therefore, holding all the independent variables (warehouse location design, inventory location, warehouse management systems, and Effective communication) constant, other

factors determining warehouse efficiency will be 0.311. The findings also show that taking all other independent variables at zero, a unit raise in warehouse location design will result in a 0.883 raise in the scores of the warehouse efficiency.

A unit that raises ineffective communication will result in 0.234 in scores of the warehouse efficiency. However, this did not work for the other independent variables which are the utilization of warehouse management system and inventory location as the significance value of this variable did exactly predict the dependent variable (warehouse efficiency). Therefore, the study also recognized a significant relationship between warehouse efficiency and warehouse location design, inventory location, warehouse management system utilization, and effective information sharing (communication). The regression coefficients were tested for significance at α=0.05. Significance occurs at p-values less than 0.05. From the above results, all four predictors are good for supply chain performance.

As (Ms. Sneha Vishnu More) a result of global competition and supply chain concepts, including a focus on integrated inventory control, warehousing has become a critical activity in the supply chain to outperform competitors in customer's service, lead-times, and costs. Timely and accurate information about products, resources, and processes are essential to operationalize a planning and control structure that effectively and efficiently achieves the higher performance of warehouse operations required in today's marketplace.

This research regression result aligned with the above statement. Therefore, from the unstandardized B column, it can be seen that effective communication is found to be statistically negative with a significant effect on warehouse efficiency (with $\boldsymbol{\beta}$ = - 0.268). Hence, it is pointed out that 26.8 percent of effective communication can negatively explain the dependent variable which is warehouse efficiency, and reported a positive level of significance which is up < 0.05.

From the perspective of the utilization of warehouse management system (Ramaa. A, K.N. Superhuman) on their study result of the impact of warehouse management system in a supply chain conclude on the study proves WMS to be an enabling factor in performance and productivity improvement. The productivity of a WMS warehouse is way higher than when the operations are manually performed. This research regression result aligned with the above statement. The study fits with the regression analysis result of this study.

Therefore, from the unstandardized B column, it can be seen that the warehouse management system is found to be statistically positively with a significant effect on warehouse efficiency (with **β** = 0.186). Hence, it is pointed out that 18.6 percent of the warehouse management system can positively explain the dependent variable which is warehouse efficiency, and reported a positive level of significance which is $p < 0.05$.

Finally from the point of warehouse location, design and inventory location (Ronald G. Askin, Ilaria Baffo & Mingjun Xia (2014)) summarized on the output of the model indicates: (i) The location and capacity level of warehouses to open; (ii) the distribution route from each production facility to each retailer; (iii) the number of products stocked at each warehouse and retailer; and (iv) the average cost per time for the specified configuration and operating policy have major impacts on warehouse efficiency. The analysis result implies that warehouse location, design, and inventory location have higher and predominant relationships for one warehouse efficiency and had fitted with the above theory.

4.6 Discussion of the Findings

The study recognized that the warehouse location design has a great effect on warehouse efficiency in the Heineken brewery kilinto plant. The study result showed also that inventory location, utilization of warehouse management system, and effective communication ensures that a valid increment in warehouse efficiency.

Further, the prediction by the regression model indicated that taking all other independent variables at zero, a unit raises in warehouse location design in warehouse efficiency. The study also recognized a strong positive correlation coefficient between warehouse location design and warehouse efficiency, the moderate relationship between inventory location, effective communication, and utilization of warehouse management system as shown by correlation factor of 0. 343, 0.320 and 0.430 respectively.

4.7 General Perceptions of Respondent without Analysis

This research provides the open-ended questions for the respondent to identify the determinate factors of warehouse efficiency from the perspective of capacity and customer satisfaction and which size of the warehouse is needed for the efficiency of warehouse related to company performance.

4.7.1 Key Warehouse Efficiency Determinant

Table 4.14 frequency of respondents

Indicators	Frequency	Percent	Valid Percent	Cumulative %
Warehouse location design	5	7.1	7.1	7.1
Inventory location	9	12.9	12.9	20
Warehouse Mgmt.System	5	7.1	7.1	27.1
Effective communication	7	10	10	37.1
All of them	44	62.9	62.9	100
Total	70	100	100	

Source; - SPSS output (2020)

Figure 4.1 key warehouse efficiency indicators from the respondent's perception

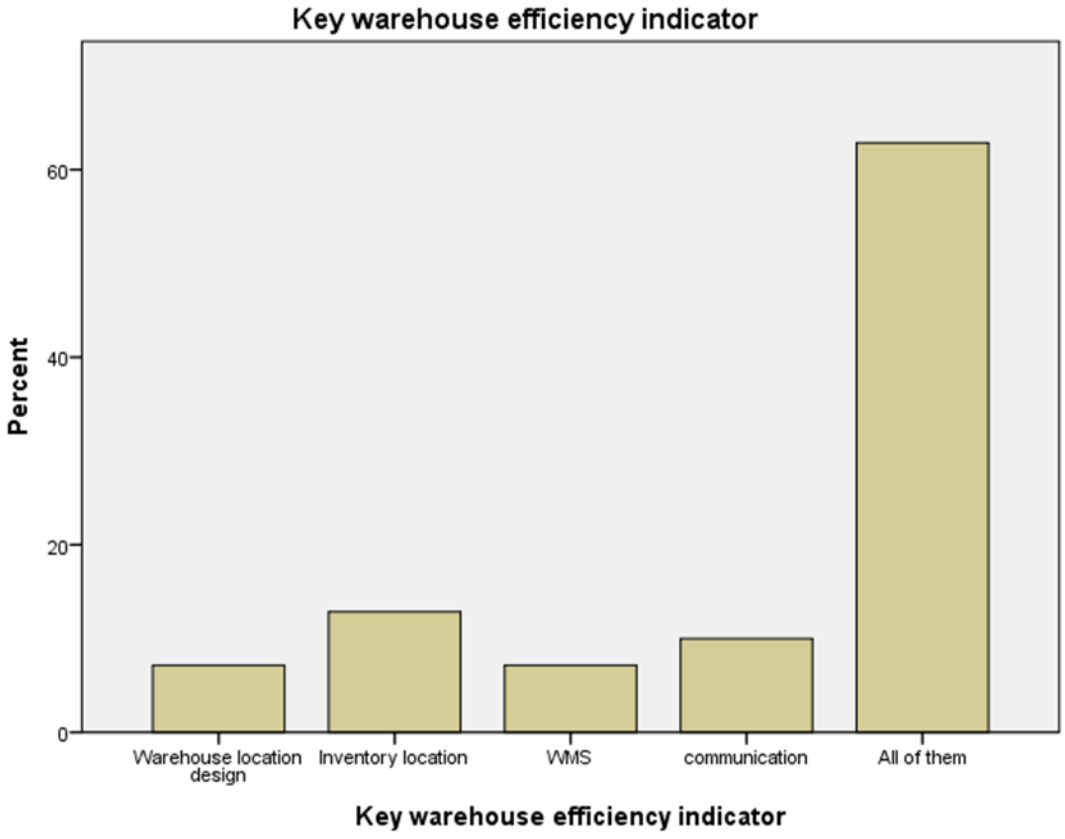

Table 4.13 and figure 4.1 depicts that most of the respondents accepted that four of the Listed factors determine the warehouse efficiency, which contains 44 respondents out of 70 had unique assumptions that all of them determine the Heineken's warehousing efficiency. From the total respondent, 9 of them accepted the inventory location is more

determines warehouse efficiency, on the other side 7 respondents strongly assumed that effective communication determines warehouse efficiency. 5 respondents out of the 70 assumed that warehouse design, location, highly determine the warehouse efficiency. When the researcher analyzed the determinate factors of warehouse efficiency through SPSS by Mean value all independent variables determine warehouse efficiency by the vales of warehouse location, design (M=3.709), Inventory location (3.652), warehouse management system (3.520) and effective communication (M=3.671).

Based on the mean value analysis of respondents agreed and aligned with the respondent's perception response. The level of determinants sequenced from maximum value for the minimum value to warehouse location, design, effective communication, inventory-location, and warehouse management system respectively.

4.7.2 Size of warehouse

Table 4.15 Respondents perception for the size of warehouse

	Frequency	Percent	Valid %	Cumulative %
Small	2	2.9	2.9	2.9
Large	14	20	20	22.9
Based on the situation and company capacity	54	77.1	77.1	100
Total	70	100	100	

Source;-SPSS output (2020)

Figure 4.2 size of warehouse

As stated in table 4.15 and figure 4.2 the convenient warehouse-size for warehouse efficiency to satisfy customers and accumulate stocks, the inventory most respondents perceive that the size depends on situations and company capacity. Most of the literature stated that warehouse-size depends on the product type, customer's need, market expansion strategies, competitor's weakness and strength, and financial performance of the company.

According to statistical results from the United States, Energy Information Administration warehouse sizes are transforming. It used to be that most warehouses were less than 10,000 square feet (ca. 9 a). Those numbers have changed: only 37% of warehouses are less than 25,000 square feet (23.23 a) (0.23 ha) and an equal amount is greater than 100,000 square feet (0.01 km²). The remaining 27% of warehouses vary between 25,000 and 50,000 square feet (4,645.15 m²), on average. That means that American warehousing has gotten much bigger - 64% of U.S. warehouses are larger than 25,000 square feet (ca. 2,323 m²) in size.

Based on the above-stated theory and this research open-ended question result to increase customer satisfaction and to improve the capacity of the warehouse, proactively identify the property of products, the volume of buffer stocks, and the nature of products and capacity of the company matters the size of the warehouse.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

INTRODUCTION

This chapter presents all the researchers' findings and data analysis summary, conclusion, and recommendations of the study. The principal objective of this research was to assess and analyze the determinant of warehouse efficiency in Heineken Ethiopian inbound and outbound warehousing activities for the kilinto site. The research also set out to identify how effective warehousing could be for enhanced organizational performance.

5.1 summary of findings

Based on the findings of this study, it summarized the results in the following paragraphs.

The primary objective of this study was to identify and analyze the determinate factors of warehouse efficiency in the Heineken Ethiopia kilinto branch. The specific objectives of this research sought to analyze the effect of warehouse layout on warehouse efficiency, to describe the impact of effective inventory location on warehouse efficiency, to examine the relationship between the warehouse management system and warehouse efficiency, and finally to analyze the relationship between effective communication and warehouse efficiency.

Regarding the determinant of warehouse efficiency for the Heineken brewery kilinto branch, the result shows that the warehouse layout design, effective inventory location, utilization of warehouse management system, and effective information sharing (communication) predominantly affected warehouse efficiency in capacity and customer satisfaction. Regarding the analysis of warehouse layout design on warehouse efficiency, most of the respondent's cumulative mean value shows that (M=3.71; SD=0.55) which means highly determined warehouse efficiency. This shows that the warehouse location design and warehouse efficiency have a positive relationship between each one.

To describe the impact of effective inventory location for one warehouse efficiency the researcher tests the effects through inventory location parameters, the finding shows that the cumulative value of respondent's mean =3.65 which is greater than neutral. The result implies that the effective inventory location increases the warehouse efficiency from the perspective of capacity and stock accessibility.

Besides examining the relationship between warehouse management systems and warehouse efficiency, the researcher tested relationships through correlation tests. The result for this shows that the relationship of the warehouse management system and warehouse efficiency by Pearson's correlation coefficient value of 0. 243* and significance level becomes 0.043 at two-level significance (0.01).

For the analysis of the relationship of effective communication and warehouse efficiency the research analysis in unique methods. When the relation tests through inferential statics' effective communication has a positive relationship with warehouse efficiency, which is significant with the Pearson's coefficient value of 0. 320** and at the significance level of 0.007 at two-tailed (0.05). When the relationship of effective communication and warehouse efficiency describes by descriptive statistics, the mean value of effective communication M=3.67 which implies that it satisfies most respondents with the provided parameters of effective communication to determine warehouse efficiency.

Warehouse location design, inventory location, warehouse management systems, and effective communications would determine warehouse efficiency. All determinants have positive relationships with warehouse efficiency and significance on two-level significance (0.01&0.05).

5.2 conclusion

This research aimed to identify the determinant of warehouse efficiency in outbound and inbound warehousing by collecting and analyzing the data through direct questioners distributed to the warehouse and logistics employees and other co-workers and direct day-to-day observation of the Heineken Brewery kilinto plant.

Warehousing activities are an essential part of every manufacturing organization and have a direct impact on their performances. Every warehousing activity had functioned alone, as it is part of integrated systems, whereas each activity has to conduct at the highest standard for each it to optimize preceding one for an overall improvement in organizational performance. The result for collected quantitative and qualitative data shows that the warehouse layout, inventory location, and effective communication or information sharing are major determinants, and the other one variable which is using the warehouse management system to technology perspective operation is a relatively low impact on

warehouse efficiency. The overall assessment of the structural model revealed that it had satisfactory statistical power in predicting the research model. Finally, the study showed that the success of organizations in operation derived from determining and controlling warehouse efficiency.

5.3 Recommendations

This stud has conducted the determinate factors of warehouse efficiency in the HEINEKEN brewery kilinto branch. In light of the conclusion stated above, the under listed possible recommendations are suggested as being valuable to HEINEKEN brewery for improvement of warehouse efficiencies from the perspective of capacity and customer satisfaction.

- HEINEKEN brewery tries to give attention to the improvement of warehouse efficiency in line with functional and departmental strategies and objectives.
- The company would seek to operate the customer first practices and to be consistent in its offers to its customers.
- The company gives priorities to discard the obsolete items from the warehouse that were put for an interminable period in the warehouse.
- The company procedurally conducts a different survey to identify customer satisfaction problems and areas within the organization.

5.4 Limitations and suggestions for further study

As many researchers' works have their limitations, this research study also subjects to known and unknown limitations.

This study focused on the determinate factors of warehouse efficiency in the cases of the HEINEKEN brewery for the kilinto site only because of time and financial resource scarcity. But other researchers can go beyond this research to find out the whole feature of HEINEKEN Ethiopia's warehousing activities within the country.

In case of resource limitation, this research did not include and observe all manufacturing industries to measure and assure their warehousing activities or not or to identify the critical factors for one warehousing activities, the study bounded in kilinto branch manufacturing plant only. The researchers suggested conducting their research hastily on all manufacturing industry warehousing practices. The research also works through subjective

measures rather than the aim. To avoid the ambiguity of measurement, future researchers use mixed metrics by emphasizing the research aim to measures warehouse efficiency from the perspective of warehouse capacity, operational quality, and needed time for one operation and customer satisfaction levels. In general, further research conducted by extending the scope of study and factors to identify the critical factors for one warehouse efficiency in warehousing activity in a holistic manner.

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APPENDIX I

QUESTIONNAIRE

ADDIS ABABA UNIVERSITY

SCHOOL OF BUSINESS & ECONOMICS GRADUATE STUDIES

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Dear respondents;

First of all, I would like to forward my deepest gratitude and respect to you for overseeing this questionnaire honestly and responsibly. The questionnaire is designed to collect the necessary information to the topic "Determinant of warehouse efficiency, in case of Heineken brewery" for the partial fulfillment of the requirements of the degree of Master of Art in Logistics and Supply Chain Management at Addis Ababa University. Enclosed is a brief questionnaire that asks a variety of open and close-ended questions about your experience toward determinant for warehouse efficiency in your respected firms. I am asking you to look over the questionnaire and, if you choose to do so, please complete the questionnaire and call me on the phone number provided below, so that I will come and take it at any time that is convenient for you.

Please do not write your name on the questionnaire. Your responses will not be identified with you, nor will anyone be able to determine which department you work. Nothing you say on the questionnaire will in any way influence your company.

I hope you will take a few minutes to complete this questionnaire. Your participation is a voluntary base. If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me at 0930616070 or lakebeminken@gmail.com.

Thank you in advance for your cooperation!

Best Regards,

Lake Beminken

Note:

1. No need to writing your name.

2. Indicate your answer with a checkmark (**X**) on the appropriate cell both for Section I and part of Section II questions and also circle your choice for questions 7 to 9.

3. If you need further explanation please do not hesitate to contact me through my phone 0930616070 or in person.

Section I: Respondents Profile:

1. Age: □ 20-28 year's □29-35 year's □36-45 year's □above 45 years

2. Sex: □ Male □ Female

3. Educational Qualification:

□ College diploma □ Advanced College diploma □First Degree (BSc, BA)

□Second Degree (MSc, MA) □ Ph.D. and above

4. Current Position

□ Manager □ Assistance Manager □ Team leader □ WH coordinator □ Admin Assistance □ FLT operator

5. Year of service in the current position:

□1 to 2 year □3 to 4 years □ 5 to 6 year's □ above 6 years

Section II: Main Questionnaire

Indicate your choice by putting the checkmark (**x**) on the appropriate cell by Likert scale.

Where, 1 =Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.

6. Please indicate the degree to which you agree with the following statements regarding the indicators of warehouse efficiency in your company. (Please take your key warehouse activities in mined whereas rating the given statements).

No-	Measurement Item	Score				
	6.1 Warehouse location design indicator	1	2	3	4	5
1	My company's warehouse location is near to the central market and has a positive advantage for market expansion.					

2	The company's warehouse location design standard fulfills the global settled warehousing standards.					
3	In our warehouse, there are designed (specific) areas that we accumulate sub-standard, the customer complained, and outdated full products and RPMs.					
4	Our warehouse layout accommodates efficient fleet parking and enables drive in and out easily					
5	Our warehouse location design does consider the flow of inventory(i.e. concerned with the controlled and uninterrupted movement of materials, peoples, and traffic)					
6.2 Inventory location indicator						
1	Most of the time, our warehouse has enough space to move goods/workers/types of machinery during inventory location activities					
2	In outbound and inbound warehouse, goods and items are placed in the correct location.					
4	warehouse personnel are skilled to perform inventory location activities					
5	In our warehouse, there are adequate facilities for inventory location activities					
6	Too much warehouse space is occupied by ideal & obsolete inventory items.					
7	All inventory items are categorized by ABC classification's					
8	HEINEKEN warehouse personnel are skilled to perform put away activities.					
6.3 Warehouse management system indicator						
1	We are using the necessary digital materials for warehouse management purposes.					

2	We are not successful in minimizing total product damage in the Warehouse-like product deterioration, breakage, leakage, through technology-based materials.					
3	WMS Improves warehouse flexibility and responsibility					
4	WMS improves warehouse safety and security					
5	We have a clear platform and have enough materials for WMS implementation in every warehousing activity					
6	WMS improves the picking accuracy of full and empty items within a warehouse					
7	WMS improves customer service levels					
6.4 Communication indicator						
1	Most of a time the company uses appropriate platforms for communications					
2	In Heineken communication build relationships & trusts between colleagues					
3	The company have regular one on one discussions for employees gap filling					
4	Most of a time the company encourages the two-way feedbacks					
5	We have a regular schedule to conduct team building activities					
6	In our company, we have open and clear communication platforms within suppliers, customers, and employees.					

7. Efficiency Indicators

Please indicate your choice by putting the checkmark (**x**) on the appropriate cell by Likert scale.

Where, 1 =Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.

10. Please indicate the degree to which you agree with the following statements regarding the indicators of warehouse efficiency in your company. (Please take your key warehouse activities in mined whereas rating the given statements).

No-	Measurement Item	Score				
Capacity indicator		1	2	3	4	5
7.1	Most of the time our warehouse personnel utilizes warehouse spaces properly i.e. the total storage space being used out of the total storage space available.					
7.2	My company use the perfect inventory location principle and procedure for maximum space utilization					
7.3	The company strongly implements a warehouse management system to increase warehouse efficiency in every warehousing activity					
7.4	In our warehouse, there are guidelines or standard operating procedures (SOP) in place that provide instructions to prevent theft, BBF controlling or leakage at a given storage location					
Customer satisfaction indicator						
7.5	Most of the time our agents and customers are satisfied through our service standard.					
	Most of the time our warehouse team serves our customers in a reasonable time.					
7.6	Most of the time our company makes products available for customers in every scenario to alleviate the product shortage in the market.					
7.7	In our company's customer service rules and regulations are open and reachable for every direction					

7.8	We and our trading partners exchange information that helps establishment of business planning and product availability.					
7.9	Our company product meet quality specification requirements on a consistent base for the seek of customer satisfaction					

Adopted from Tewodros Bogale

8. Which efficiency indicator do you believe that highly determines the overall warehouse efficiency?

A. warehouse location design Indicator B. inventory location Indicator C. warehouse management Indicator D. communication indicator E. All

9. Based on your experience which size of Warehouse is preferable and convenient for the warehouse's efficient operation?

A. Small B. Medium C. Large D. Based on situation and company capacity