The Effect of Warehouse Operations on Organizational Performance: The Case of Ethiopia Disaster Risk Management Commission At Adama Branch

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The Effect of Warehouse Operations on Organizational Performance: The Case of Ethiopia Disaster Risk Management Commission, Adama Branch

A Thesis Submitted to Addis Ababa University, School of Commerce in Partial Fulfilment of the Requirements for the degree of Masters of Arts in Logistics and Supply Chain Management (MA LSCM)

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DECLARATION

I, the undersigned, declare that this is my original work and has not been submitted to any other college, institution or university other than Addis Ababa University for academic credit.

Signed: _____ Date: _____

Fekade Tariku (GSD: 6012/12)

Statement of Certification

This paper has been presented for examination with my approval as the appointed academic advisor.

Advisor: Fesseha Afework (Asst. Prof.)

_____

Date & Signature

Addis Ababa University

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This is to certify that the thesis carried out by Fekade Tariku, entitled **'The Effect of Warehouse Operations on Organizational Performance: The Case of Ethiopia Disaster Risk Management Commission, Adama Branch***'* and submitted in partial fulfilment of the requirements of the Degree of Master of Art in Logistics and Supply Chain Management complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Abstract

Warehouses are focal points for product and information flow between sources of supply and beneficiaries. The purpose of this study was to explain the impact that warehouse operations had on organizational performance in the case of DRMC Adama. Randomly chosen 119 employees and management members at different levels were the sources of primary data for the research apart from published documents and reports as a secondary source. A fully structured self-administered questionnaire on a five point likert scale was the main data collection instrument in addition to key informants' interview. Descriptive results revealed that DRMC Adama was performing well in the key warehouse operations especially in storage and receiving activities followed by shipping, order picking/packing and put-away, respectively. Pearson's correlation revealed existence of a statistically significant (at .01 levels) positive association between organizational performance and each of the receiving, put-away, storage, order picking/packing, and shipping warehouse operations. The association was stronger between shipping and organizational performance. Regression result indicated that each of the key warehouse operations practiced in DRMC Adama significantly (except for put-away) affect organizational performance in a positive manner. The five key warehouse operations combined can explain about 58% of the variation observed in organizational performance. It was conclusive that by bringing operational efficiency in warehouse activities DRMC Adama can improve organizational performance and achieve its goals; rescuing millions of lives. Yet, compared with modern warehouses and warehousing operations, the absence of IT supports and machineries were learned to impair warehouse operational efficiency in the case of DRMC Adama. The use of IT infrastructures and support system, acquiring machineries such as forklifts, and providing employees with training were recommended to help improve warehouse operations.

Keywords: warehouse operations, organizational performance, put-away, order picking/packing

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List of Acronym

DRMC- Disaster Risk Management Commission

OPP – Order picking/packing

PTA - Put-away activity

REC - Receiving activity

SHI - Shipping activity

STR- Storage activity

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

The warehouse is considered as an integrated component of the logistics chain, which allows to achieve a high level of profitability (Oleg, Marchuk & Oksana, 2020). Warehousing and processing of goods are important components of the logistics activities of retailers, manufacturers, distributors and activities of industrial enterprises. Warehouses function as a buffer between the variability of supply and demand, which makes them necessary element in the contemporary supply chains (Frazelle, 2015). Warehouses are essential as demands in a supply chain fluctuate more suddenly and frequently than the supply (Bartholdi III & Hackman, 2014). The primary aim for warehouses is to facilitate the movement of goods from suppliers to customers while meeting the customers' demand in a timely and cost-effective manner. However, the high expenses can aggravate the challenge to achieve cost-effective warehousing services with a high level of customer satisfaction simultaneously. There are several factors influencing the success of warehousing resulting in tighter inventory control and shorter response time (Frazelle, 2015).

Effective performance evaluation contributes in increasing the transparency and accountability of disaster response (Baki & Abuasad, 2020) (Beamon & Balcik, 2008). Different requirements from different sales channels (e-commerce, retail, indirect channels, omni-channels), from different production philosophies (e.g., lean or agile), different managerial perspectives (e.g., economic efficiency, green performance and social responsibility), and the choice between old and new technologies [e.g., radio frequency identification device (RFID) and bar coding, different degrees of automation, decentralized control, cyber-physical systems, voice picking, warehouse management systems(WMS), etc.] impose challenges and opportunities for the warehousing operations (Hoda & Andreas, 2015). There is a difference between the warehouse research and the practice of warehouse operations. Cross fertilization between the groups of practitioners and researchers appears to be very limited. Bridging this gap would improve the state-of-the-art in warehouse operation (Gu, Goetschalckx, & McGinnis, 2010).

This study aimed to explain the humanitarian relief warehouse operation assessment and organizational performance specifically in response to the beneficiary's request from the employees' point of view. Accordingly, the study attempted to assess the key warehouse activities and employees' perceived performance level of their organization with possible cause-effect relationship between the two. The warehouse to be considered for this study is found in Adama that serves as central warehousing for relief supplies storage and distribution.

1.2. Statement of the Problem

Traditionally efficient warehouse operations were straightforward progression of receiving, storing, and shipping. However with the advancement of technology, supply chain integration and globalization, warehousing has become more complex. Now, warehousing requires modern tools, metrics, and methodologies for increasing the effectiveness and productivity of warehouse operations (Frazelle, 2015). Warehouses not only play an important connecting role in the supply chain, they also impact cost and have become complex entities to manage. Warehousing operations are now carried out by different types of organisations in the supply chain including manufacturers and suppliers. It is important, therefore, to continuously examine how warehouse operations are communicated and their impact on the organizational performance. Fulfilling these requirements for developing country, like Ethiopia, will not be a simple task especially for EDRMC Adama branch warehouses.

The researcher had a briefed discussion with a warehouse team leader of the organization on the operations of the warehouses and had a chance to observe the current status of the warehousing. As could be learned from the observation and the discussion, the organization did not use modern technologies and that most of the operations of the warehouses were performed manually. It uses only man power to load and unload goods. It is not clear that whether the organization has a common communication platform or not for the activities performed in the warehouses. Moreover, the goods are put away traditionally.

Therefore; the challenges of warehouses that apply conventional old technologies combined with crowded conditions could result in slow material movement leading to increased operating costs and dissatisfaction leading to complain from the client side. On the other side, there is a need for quick relief response.

In principle, warehousing comprises a set of activities that are performed to ensure the seamless flow of materials and information. Therefore, there is a need to assess and improve the performance of these activities accordingly. Factors influencing process efficiency in the warehousing environment include layout choices and the policies by which work routines are controlled (Aminoff , Kettunen , & Pajunen-Muhonen , 2002). The performance of warehouse design and operation needs to be assessed in terms of cost, throughput and space utilization (Gu, Goetschalckx, & McGinnis, 2010).

Studies reveal that there are limited research efforts focusing on warehouse operation, though there are many challenging research questions and problems that have not received any attention. The challenge for the academic research community is to focus on the integrated design and operation of warehouses (Gu, Goetschalckx, & McGinnis, 2010). There is yet no direct linking or causal association of warehousing operations and organizational performance in such not for profit public organisation and particularly from a quantitative perspective.

The researcher argue that the key warehouse operations namely receiving activity, put-away activity, storage activity, order picking/packing activity, and shipping activity were not given special attention and integrative treatment on the practices and its association with organizational effectiveness. Thus, further characterizing these activities and its contribution to organizational performance in a different organizational setting in general and in humanitarian organization like DRMC Adama, in particular will add value to empirical data along with managerial implication to improvement.

In Ethiopian context studies on warehouse operations and its associations with organizational performance were made by different researchers for public as well as private organizations, such as Tewodros (2016) in Ethiopian Trading Enterprise case, Anteneh (2017) in Save the children Gambela case both using descriptive approach, Lake (2020) in Heiken Brewery warehouse efficiency using regression model. However, the key warehouse operations and their respective integrative impact on organizational performance in the case of humanitarian public organization is limited in terms of study approach (method) and context.

The purpose of this research is, therefore, to explain the impact of key warehouse operations on organizational performance. It examined to what extent the Adama branch Ethiopia Disaster Risk Management Commission (EDRMC) warehouses operation are performed and

its link to the overall organizational performance in terms of beneficiaries satisfaction, reduction in total product damage, timeliness, achieving stated goals and objectives.

1.3. Research Questions

Generally, the researcher attempted to obtain answer for the question "How do warehouse operations affect organizational performance? In doing so the following specific questions were addressed:

1. To what extent does EDRMC Adama branch perform its warehouse operations?
2. What are the impacts of key warehouse activities on the performance of EDRMC Adama branch?
3. What are the challenges in warehouse operations of DRMC Adama branch?

1.4. Objective of the Study

1.4.1 General Objective

The overall objective of this study was to explain the impact of warehouses operations on its performance in response to the emergency relief requests with the case of EDRMC Adama branch.

1.4.2. Specific Objectives

From the general perspective, specifically this study aimed to clearly address the outlined research questions described under research question section.

1. To determine the extent by which the warehouse operations are performed EDRMC Adama branch
2. To explain the impact of key warehouse operations have on the overall performance of EDRMC Adama branch
3. To identify the challenges against warehouse operational efficiency in DRMC Adama branch

1.5. Significance of the Study

The findings of this research are meant for both practitioners and researchers. For the warehouse, the study can provide useful insight into characteristics of key warehouse activities and the extent of impact on organizational performance (goal achievement) in organizations with larger warehouses in general, and in humanitarian organizations in

particular. Based on this managers and policy makers may make use of the deliverables of this material in redesigning/intervening and improving key warehouse activities. Hence, the beneficiary as well as the staffs would be benefited if the activities are improved or new program is designed and implemented based on the output of this study. The study can also be used as a supplementary document for EDRMC to conduct related research on other sites. Apart from this, the study can contribute to the limited theoretical and empirical (practical) findings and views of warehouse operations as one navigate through various conceptual and empirical literatures.

1.6. Scope of the Study

Assessing the performance of a warehouse can be done from various perspectives such as in terms of cost, throughput, space utilization, and the service it provides to its clients. Of course these factors are somehow related; however this research work focused on warehouse operations based on the performance indicators.

Geographically, EDRMC has warehouses in different regions of Ethiopia. The nature of the problems may vary from place to place due to various factors though the warehouse operations manual is the same. It would have been good to see the problems in all branches but it is beyond the scope of this research as it is a case study which will be carried out by individual student researcher. Yet, the Adama branch warehouses are the largest in the country that is used as a hub.

In addition to the geographical scope, the study period fell in 2021/22 and the findings and inferences made significantly depends on the study time practice/situation as the organization activities heavily prone to disastrouse situations.

1.7 Definition of key Terms

Picking: The operations involved in pulling products from storage areas to complete a customer order (Kmcewen, 2014).

Packing: the process of preparing a container for shipment (Kmcewen, 2014).

ABC Analysis: A classification of items in an inventory according to importance defined in terms of criteria such as sales volume and purchase volume (Kmcewen, 2014).

Put Away: Removing the material from the dock (or other location of receipt), transporting the material to a storage area, placing that material in a staging area, and then moving it to a

specific location and recording the movement and identification of the location where the material has been place (Kmcewen, 2014).

Warehouse: Storage place for products. Principal warehouse activities include receipt of product, storage, shipment, and order picking (Kmcewen, 2014).

Organizational performance: comprises the actual output or results of an organization as measured against its intended outputs (or goals and objectives) (“Organizational performance “, 2022).

1.8 Organization of the Study

The whole process of this study is planned to be organized in five chapters. The first chapter is introduction that consists of background of the study, statement of the problem, research question, research objectives, and significance of the study and scope of the study. Chapter two is about review of the related and relevant literature to the study area. It covers the theoretical reviews, empirical review and conceptual framework of the study. Chapter three describes the research design and methodology which deals with research design, and research population, sample size, and sampling technique. Chapter four dwell into the data presentation and analysis gathered in the course of study. Chapter five is the last chapter that summarizes, recommends and concludes the study findings.

CHAPTER TWO

LITERATURE REVIEW

2.1. Theoretical Review

One of the important components in logistic performance is warehouse performance. As competition for many markets is spelled as ‘‘faster,’’ ‘‘cheaper,’’ ‘‘broader assortment,’’ ‘‘more customized,’’ ‘‘home delivery,’’ etc. and markets at the same time are becoming more global, those requirements will also impact a logistics function like warehousing (Hoda & Andreas, 2015). Good warehouse performance will improve quality performance, delivery time, customer satisfaction and reduce cost in logistics system (Marco & Mangano, 2011). A warehouse is the depository of all materials required by an industrial unit and supplied materials as and when required (Lake, 2020). It requires uncommon types of materials for different operations in a production unit. The gap between service provision/production and that of consumption of the product/service is the key for a warehouse existence. Warehousing or storage refers to the holding and preservation of goods until it dispatches them to the consumers (Lake, 2020).

The role of warehouses is matching the demand with supply through storage and distribution of the required resources to the required places at the right time. Studies reveal that understanding warehouse design and management principles can play an important role in improving the efficiency of operations and improving customer service levels. The introduction of Warehouse Management Systems (WMS) can also help increase operational flexibility and boost customer satisfaction (De Koster, Johnson, & Roy, 2017).

Warehouse Activities

According to (Frazelle, 2015), there are similar activities among different kinds of warehouses, these include: Receive, Put away, Order picking, and Shipping. Bartholdi & Hackman (2011) illustrates the normal physical activities and flows in a warehouse. The inbound processes are represented by receiving and put-away whilst the outbound processes include picking, packing and shipping.

Receiving

Receiving is the first warehouse process and one of the most crucial. To perform the receiving process properly, the warehouse should be able to verify that it has received the right product, in the right quantity, in the right condition, and at the right time. This process under normal circumstances represents nearly 10% cost. Failing to do so will have consequent impacts on all subsequent operations. Receiving, goods-in or in-handling is a crucial process within the warehouse. Ensuring that the correct product has been received in the right quantity and in the right condition at the right time is one of the mainstays of the warehouse operation.

Receiving also involves the transfer of responsibility for the goods to the warehouse (Hector, 2021). This places accountability on the warehouse for maintaining the condition of the goods until they are shipped. Properly receiving cargo will allow you to filter out damaged goods and avoid liability for them (Hector, 2021). The ultimate objective of this process is to receive cargo efficiently and correctly and to avoid accumulation at the receiving docks. There are many steps that need to be taken before the actual act of receiving takes place. The following are important steps in this case (Gwynne, 2014):

Pre-receipt: First we need to ensure that the supplier presents the products to the warehouse in the most appropriate way. It is normally the buyer who specifies the product and therefore may not have knowledge of the goods-receiving operation. The warehouse manager is also involved in specifying and agreeing the packaging, items per carton, cartons per pallet, TiHi (cases per layer, layers per pallet) and any specific labeling required, together with the mode of transport to ensure that the products ordered are compatible with the storage facility. All too often we see items arriving at warehouses in unsuitable packaging that overhangs pallets, has incorrect or badly positioned labels and with the goods packed in quantities that do not relate to selling-pack quantities (Gwynne, 2014):. All these problems take time to resolve and are better handled at the supplier prior to delivery.

Areas that need to be discussed both internally and externally prior to the order being placed should include: size and type of cartons, type of transit packaging – cardboard, plastic, totes, metal stillages, roll cages, pallets, palletized or non-palletized delivery of product, size (length, width and height) and type of pallets, eg euro pallet, four-way entry, specific labeling such as product description, barcode and quantities, position of label on carton and pallet, carton quantities (inner and outer carton quantities, for example); and mode of transport, delivery quantity and frequency of delivery (Gwynne, 2014):. The method of delivery needs to be compatible with the unloading equipment available at the warehouse. The lack of

loading bays, for example, will necessitate the use of tail-lift-equipped or side-(un)loading vehicles.

In-handling: One of the main challenges for a warehouse manager is to match labor hours with work content. Handling a product the least amount of time possible (labor touch points) leads to reduced labor hours and as a consequence, reduced cost (Gwynne, 2014):. Depending on the operation, labor can be the single biggest cost within a warehouse. It can be between 48 and 60 per cent of the total warehouse cost depending on the amount of automation utilized. It is also the most difficult cost to control. In-handling makes up approximately 20 per cent of the total direct labor cost within a retail warehouse (Gwynne, 2014).

Preparation: Prior to the actual receipt a number of processes need to take place. The first step is to ensure that suppliers deliver into the warehouse when you decide, not when it suits them (Gwynne, 2014). There will be exceptions to this. For example, it is difficult for parcel delivery companies to adhere to booking times because of the nature of their deliveries; however, pallet and full-load delivery companies expect to be given specific delivery times, albeit this is not their preferred option. By providing delivery times for each supplier or their subcontractors, you are in control and able to match your work hours to work content. A booking-in or dock scheduling system needs to be introduced. Many of today's warehouse management systems have a dock scheduling module these days however an Excel spreadsheet will suffice (Gwynne, 2014). Initially you need to decide on when you are going to receive products into the warehouse. Are you going to have deliveries throughout the day or limit them to a morning shift, for example? You need to keep records of the time it takes for each type of delivery and share this information with your booking-in team. This will give us the amount of labor and equipment required to undertake the task, thus making planning a great deal easier (Gwynne, 2014).

Offloading: On arrival, the vehicle details need to be checked against the booking reference and the vehicle allocated a loading bay or location in the yard. Any vehicle seals need to be checked against the delivery paperwork. Prior to offloading temperature-controlled vehicles, the temperature history of the vehicle whilst in transit needs to be checked, together with the current temperature of the goods (Gwynne, 2014). Once the vehicle has backed onto the appropriate bay or has been positioned in the yard for offloading from the sides, the in-handling team should have appropriate labor and equipment to hand, to efficiently manage the offloading process. Where vehicles are unloaded in the yard this usually necessitates the

use of two lift trucks, one to unload the trailer and another to put the product away within the warehouse. The introduction of articulated forklift trucks which can work both inside and outside the warehouse is going some way to reducing the requirement for two different types of truck for the latter operation. Unloading loose-loaded containers has always been a time-consuming operation.

This normally necessitates having at least two people unloading within the container and placing the items onto a pallet. A third person is usually waiting for the pallet to be stacked before taking it to the checking area before put away. This is very unproductive as the staff within the container wait for full pallets to be replaced with empty ones whilst the forklift driver is waiting for the pallet to be built (Gwynne, 2014):. There is no guarantee that the same product is together within the container, therefore more sortation needs to take place on the unloading dock. This is very inefficient and can be hazardous to the staff, who are continually bending and stretching within the container (Gwynne, 2014).

Checking: Once the goods are offloaded, you need to decide whether they need to be checked before put-away. The ideal scenario is to move inbound goods directly from the loading bay to the storage area or despatch area if goods are cross docked. However, trust is an issue here and unless you are 100 per cent certain that your suppliers are totally accurate with their deliveries on every occasion, some form of checking will need to take place (Gwynne, 2014). Where new suppliers are concerned it is likely that you will want to check the whole of the consignment initially until you are confident of the accuracy of the supplier.

Cross docking: The goal of most warehouses is to increase throughput rates and reduce the amount of stock held (Gwynne, 2014). Cross docking is a process where products are moved directly from goods-in to the despatch bays. This replaces the need to place the product into store and any subsequent picking operation. Cross docking needs the full support of suppliers as to how they present the product. This includes clear labeling and advance notice of arrival together with accurate, on-time delivery. Cross docking requires systems to identify the product that needs to be cross docked and a process needs to be in place to recognize and alert the staff. Once checked in, the products should be taken directly to the despatch area and their floor or temporary rack location recorded on the system, alerting staff that the product is now awaiting despatch. The details must be recorded in order to provide an audit trail.

Recording: Depending on the product, there could be a requirement to record more than just the standard data such as product code, description and quantity on arrival (Gwynne, 2014).

Other information could include batch or lot numbers and serial numbers. Barcode scanning, which we will look at in the following chapters, is ideal for this type of data capture.

Quality control: It is accepted that certain products will require more stringent checking on receipt. These include high-value items, food, hazardous goods, temperature-sensitive product and pharmaceuticals. New suppliers will also fall into this category. An area close to the receiving bay should be set aside to spot check items on arrival (Gwynne, 2014). This needs to be done as promptly and as efficiently as possible so as to avoid congestion and to get the products onto the system quickly. If there are issues, the items need to be taken to a specific quarantine area or, if space is an issue, to the storage area – but must be identified as defective or awaiting the results of tests. Most WMSs are able to block access to products on the system, making them unavailable for picking until cleared for sale. A physical sign at the location is an additional failsafe.

Put-away

Put-away is the second warehouse process and is the movement of goods from the receiving dock to the most optimal warehouse storage location. Failing to place goods in their most ideal location can impair the productivity of warehouse operation. When goods are put away properly, there are several benefits of put away and among them are cargo is stored faster and more efficiently, Travel time is minimized, safety of goods and employees is ensured, Warehouse space utilization is maximized, and cargo is easier and faster to find, track, and retrieve. Put-away takes about 15 % of warehousing operating expenses. An optimal put-away process helps to move goods for storage to their most optimal location in a fast, efficient, and effective manner (Hector, 2021).

An important decision to take is whether products are placed into fixed or random locations. In utilizing fixed locations you are designating a specific location for a particular product. A random location is, as it states, where the pallet is placed in the most efficient slot available. Fixed positions enable the picker to memorize the actual location and speed up the picking process. However, if there is no stock for that particular product at any time, the slot remains empty and pallet storage utilization reduces significantly. Factors to bear in mind when locating product include their specific characteristics. For example, hazardous items need to be stored in an appropriate area. Items of high value will also require special storage conditions, which might mean a lockable cage or the use of a secure carousel.

When locating cartons, the fastest-moving items should be placed in the middle row of shelving so that the order picker doesn't have to spend time bending and stretching. Slower-moving items should occupy the lowest and highest shelves.

Storage

Storage is the warehouse process in which goods are placed into their most appropriate storage space. When done properly, the storage process fully maximizes the available space in your warehouse and increases labour efficiency. Storage functions are usually an extension of receiving department duties. The basic functions of storage are the movement of products from the dock area to a holding location, the recording of the location and quantity, and the updating of storage records so that the product can be found easily when it is needed (Gwynne, 2014). Retrieval of products from holding locations may also be assigned to storage operations and/or may be a function of picking operations.

There are two basic methodologies for setting up a storage system (Gwynne, 2014):
The first is simply using the floor, lining pallets up in rows, and stacking pallets of like product on top of each other. This method is usually referred to as bulk storage. This can be a valid option for a warehouse with a very low ceiling. It can also be a good option for storing many pallets of the same product. The second one is installing pallet rack and/or shelving in rows. This widely accepted method, usually referred to as rack storage, usually makes good use of available space and is cost effective so long as the ceiling height allows at least three levels of full pallet storage. The higher the ceiling, the more cost effective rack storage usually becomes.

Storage normally occupies most available warehouse space. This being so, one might find it best to lay out the entire building for storage before attempting to determine space needs for other warehouse functions (Gwynne, 2014). Once the best storage layout is determined, simply remove parts of it to accommodate the other functions.

Before selecting storage equipment, one must know the dimensions and weights of the unit loads to be handled. The unit loads will normally be cartons stacked on wood pallets. The pallet used determines the width and depth of the unit load. The standard pallet is 40 inches wide and 48 inches deep. The height of the pallet plus the height of the cartons stacked on the pallet determine the height of the unit load. Because the height of cartons usually varies, you will need to set the height at a level that best accommodates the various carton heights. Once

you know the unit load specs, you can work with equipment vendors to determine which pallet racks and lift trucks best meet your needs. Generally it is best to select equipment that somewhat exceeds your weight requirements. The added degree of safety is well worth the slightly higher cost.

The size of the product received usually varies from a few cartons to a few pallets. Approximately 20% of full pallet locations have been reduced in height by one foot, and we store less than pallet loads in them. Locator codes allow the full pallet locations to be split for holding up to three products. These simple changes add locations to your storage system without requiring additional floor space and enable you to use existing space more efficiently (Gwynne, 2014).

Picking

Picking is the warehouse process that collects products in a warehouse to fulfill customer orders. Since it is the costliest process in the warehouse, comprising as much as 55% of the total operating expense, optimizing this process allow us to reduce costs significantly and increase our warehouse efficiency. Streamlining of this process should also focus on achieving higher accuracy, as errors can have a direct impact on our customer satisfaction.

Order picking is the most costly activity within today's warehouses. Not only is it labour intensive, but it is challenging to automate, can be difficult to plan, is prone to error and crucially has a direct impact on customer service. Typical errors include omitting items from the order, sending the wrong item and sending the wrong number of items. Companies target the picking operation as the area in which productivity improvements can make a significant difference to overall costs. The trade-off in this instance is between speed, cost and accuracy. The picking operation has changed significantly over the past 20 years. Previously, full-case and pallet picks tended to be the norm. Today, concepts such as just in time, the growth in online shopping and significant reductions in order lead times have resulted in smaller order quantities and more frequent deliveries.

According to Frazelle (2015), less than 15 per cent of SKUs within a warehouse are assigned to the most efficient location, resulting in a 10 to 30 per cent cost increase in travel time and underutilized locations. Prior to laying out a warehouse, deciding on the most appropriate handling equipment, installing storage systems and deciding on which form of picking system to introduce, a full ABC analysis of stock movements and stock held should take place.

In order to be productive and efficient in the picking process, a great deal of preparation needs to take place which include having a comprehensive understanding of the products and their sales patterns and the data available to produce ABC analyses (Gwynne, 2014). Placing products in the most appropriate location reduces travel distances and strain on operatives and as a consequence leads to improved productivity and overall cost reduction (Gwynne, 2014).

According to OPS (2009) the 'Ten Commandments of picking' are as follows:

Design for flexibility and scalability – things change – build for today, design for the future Keep pickers picking... not waiting or undertaking other tasks such as carton erection, packing, labeling, etc., Minimize travel, Minimize product touches. If you have expert pickers you shouldn't need to check their work, Never let pickers arrive at an empty location, Measure, measure, measure (productivity and accuracy but also product dimensions), Pick logically, slot intelligently, Pick accurately – get it right first time, Continue to learn and explore, Advocate continuous improvement

Packing

Packing is the warehouse process that consolidates picked items in a sales order and prepares them for shipment to the customer. One of the primary tasks of packing is to ensure that damages are minimized from the time items leave the warehouse. Additionally, packaging must be light enough so as not to increase the weight of the goods and minimal enough to control packaging costs.

Product packaging has a significant impact on the sustainability of the supply chain as a whole. There are three main types of packaging, according to Envirowise, a UK government agency:

Primary (sales) packaging. This is the packaging around a product at the point of purchase by the user/consumer. Examples include bottles, tins, plastic covers or wrapping.

Secondary (grouped) packaging. This packaging groups a number of items together until the point of sale. Examples include an inner or outer box and strapping which binds a number of items together.

Tertiary (transport) packaging. This packaging allows handling and transportation of a number of grouped items as a single unit load. Over recent years the mainstays of returnable transit packaging (RTP), the wooden pallet and the metal stillage, have been joined by many other forms of RTP. These include plastic pallets, tote boxes and metal cages.

There are many reasons for reducing packaging costs. These include: Lower packaging costs mean higher profits, and Waste minimization benefits your own company and the environment.

If packages are poorly packed, the possibility of damage increases greatly. The shipping carton should be of such strength that it cannot be bent or crushed easily, and it should be packed so that the products will not shift during transit. If you want to know how and how not to pack, spend a few days in your customer-returns area monitoring the condition of packages and their contents in relation to how they are packed. Pay close attention to packages refused by the customer and returned to you unopened. If your packages are damaged when you get them back, you are not doing an adequate job in your packing area.

The equipment needed in the packing area includes tape machines, box knives, and various stamps. If you do not use a conveyor system, you will need a packing table. If you do use a conveyor, you will likely pack on the conveyor itself. You might also need some equipment to apply or affix labels to the cartons—although I assume most of you are using peel-and-stick labels as much as possible.

Shipping

Shipping is the final warehouse process and the start of the journey of goods from the warehouse to the customer. Shipping is considered successful only if the right order is sorted and loaded, is dispatched to the right customer, travels through the right transit mode, and is delivered safely and on time. Previous processes, such as ordering, put-away, picking, and packing, are also vital to the success of shipping because they greatly affect whether the order is fulfilled accurately and safely.

Warehouses in highly developed countries will no doubt adopt the latest technology, and companies whose products can absorb the high initial capital investment will be at the forefront of warehouse automation. However, automation is not for everyone, and warehouses will continue to hold stock and employ staff to receive, put away, pick and despatch products.

Shipping operations is where the final steps are taken to prepare orders for shipment via the requested mode of transit. The tasks performed usually include weighing each carton, recording shipment information in a manifest system, and applying address labels generated by the manifest system. If the shipment is going by mail, correct postage is applied. If the shipment is going by truck or air-freight carrier, a bill of lading is completed. After packages

are processed, they are sorted to pallets or tubs so they can be moved to the shipping dock for carrier pickup.

It is usually considered shipping's responsibility to ensure that all shipments are picked up the day they are ready to ship and that all shipping paperwork is routed to the correct departments at the end of each shipping day.

If you ship many packages a day, it is also essential that you acquire your own manifest system. The manifest system should support all the modes of shipping you normally use, including truck and US Mail. It should also allow you to import shipping data from an export file generated from your business software. Setting up your own customer database in the manifest system is not a good idea because addresses change on a regular basis. Using the export file from the business software ensures that the address information is correct when a new order for the customer is processed. This eliminates the need to check all addresses generated by the manifest system against the picking documents, saving you both time and incorrectly shipped orders.

Types of Warehouses

Among the different types of warehouses the following are commonly known:

Private Warehouses: The warehouses which are owned and managed by the manufacturers or traders to store, exclusively, their own stock of goods are known as private warehouses. Generally these warehouses are constructed by the farmers near their fields, by wholesalers and retailers near their business centres and by manufacturers near their factories (Mungeapen, 2020). The design and the facilities provided therein are according to the nature of products to be stored.

Public Warehouses: The warehouses which are run to store goods of the general public are known as public warehouses (Mungeapen, 2020). Anyone can store his/her goods in these warehouses on payment of rent. An individual, a partnership firm or a company may own these warehouses. To start such warehouses a license from the government is required. The government also regulates the functions and operations of these warehouses. Mostly these warehouses are used by manufacturers, wholesalers, exporters, importers, government agencies, etc.

Government Warehouses: These warehouses are owned, managed and controlled by central or state governments or public corporations or local authorities (Mungeapen, 2020). Both government and private enterprises may use these warehouses to store their goods.

Bonded Warehouses: These warehouses are owned, managed and controlled by government as well as private agencies (Mungeapen, 2020). Private bonded warehouses have to obtain license from the government. Bonded warehouses are used to store imported goods for which import duty is yet to be paid in case of imported goods the importers are not allowed to take away the goods from the ports till such duty is paid (Mungeapen, 2020). These warehouses are generally owned by dock authorities and found near the ports.

Co-operative Warehouses: These warehouses are owned, managed and controlled by cooperative societies (Mungeapen, 2020). They provide warehousing facilities at the most economical rates to the members of their society

Automated Warehouse: With advances in computer and robotics technology many warehouses now have automated capabilities (Mungeapen, 2020). The level of automation ranges from a small conveyor belt transporting products in a small area all the way up to a fully automated facility where only a few people are needed to handle storage activity for thousands of pounds (kilograms of product (Mungeapen, 2020).

Warehouse Management

Different supplies have different characteristics in terms of material lifetime and demand urgency and therefore need different management mechanisms. First, the demand for Disaster Relief Supplies (DRS) is unpredictable due to the unexpected event at unexpected locations in most of the situations. Second, the amount, type, and emergency of demand are highly uncertain due to the different damage levels and geographic conditions. Third, the timely efficiency of the availability and delivery of DRS is extremely important in the relief process. Lastly, the demand and supply of these materials and equipment are mandatory and have strong social value. Furthermore, due to the low economic or market value of DRS, government agencies are responsible for the collection, purchasing, storing, delivery, and coordination of materials most of the time and situations (Ye & Yan, 2020).

Warehouse can play a key role in the integrated logistics strategy and its building and maintaining good relationships between supply chain partners. Warehousing affects customer service stock-out rates and firm's sales and marketing success. A warehouse smoothens out market supply and demand fluctuations. When supply exceeds demand, demand warehouse stores products in anticipation of customer's requirements and when demand exceeds supply the warehouse can speed product movement to the customer by performing additional services like marking prices, packaging products or final assemblies. Warehousing can be defined as a location with adequate facilities where volume shipments are received from

production centre, which are then broken down in to particular order and shipped onwards to the customer. Warehousing is an integral part of any logistics system. The warehouse is a link between producer and customer. Warehouse Management provides the insight into your inventory and the warehouse management tools to help you increase customer satisfaction and reduce costs. Warehouse Management exchanges information with many other functional areas in the solution including Logistics, Production and Trade, to help improve your overall business performance. Warehouse Management is used to optimize Inventory, Labor, Physical Space, and Time (Divyendu1, 2019).

Warehouse management system is tool that empowers the warehouse manager to control and guide the operation. Warehouse Management Systems (WMS) provide capabilities to efficiently run the on-going operations of a warehouse. These systems keep track of inventory levels and stocking locations within a warehouse and they support the actions needed to pick, pack, and ship product to fill customer orders (Hugos , 2003). Most warehouses benefit from the functionality provided by a WMS. Investments in warehouse systems are often reasoned by their ability to reduce operational costs and increase performance accuracy through real-time control of operations, easier communication throughout the supply chain, and higher levels of automation (Gu, Goetschalckx, & McGinnis, 2010) .

Warehouse Operations Key Performance Indicators

Warehouse operation performance measurement emphasizes the "6Rs" of logistics. The "6Rs" of logistics describe the logistic targets as the delivery of

- the right goods at the
- right time in the – e.g. the arrival of requested supplies at the right time
- right quantity and the
- right quality at the
- right location at the – e.g. the distribution of supplies to the right place
- right costs (Hompel & Schmidt, 2007).

A company's warehouse operations can influence the firm's corporate performance in manners such as receiving, storage and shipping dispatching) in relation with quality, Cost, speed and productivity.

a) Quality

Inventory Accuracy Rate: This indicator measures the percentage of warehouse or storage locations that had no inventory discrepancies when stock cards were compared to a physical

inventory count out of the total number of locations under review, during a defined period of time. Alternatively, this indicator can be calculated for a single facility as the percentage of months or quarters with no inventory discrepancies out of the total number of months or quarters in the review period (e.g., annual).

Put-Away Accuracy: This indicator is the percentage of items placed in the correct location or bin in a or storage area. This indicator measures a facility's ability to stock items in the correct location so they can be quickly and easily located. This can provide an indication of whether staff is practicing good warehousing practices and guidelines. This indicator can be measured during a site visit or by making periodic checks at the facility over a specified length of time. For example, during a quarterly period, the number of times items were found in the wrong location.

Picking Accuracy Rate: This indicator is defined as the percentage of items or lines picked accurately (i.e., the correct items and quantities) from storage based on a request or packing list, and then placed into the appropriate container.

Warehouse Accident Rate This indicator measures the total number of accidents occurring in a warehouse or other storage facility during a defined period of time. This indicator can reveal poor warehouse management and practices, untrained staff, unclear safety guidelines, faulty equipment, or poor conditions. It can help pinpoint areas needing improvement by determining the cause of the accidents because of human error or other reasons. With intervention, accidents should decrease in frequency.

b) Response Time

Warehouse Order Processing Time: This indicator measures the average amount of time (e.g., minutes, hours, days, weeks) from the moment an order is received at the storage facility until the time the order is actually shipped to the client. The order processing time can be calculated for a specific shipping facility averaged across orders or on average for orders to a specific client or for a specific product.

This indicator helps monitor the order processing performance and the efficiency of a shipping facility. It also helps identify opportunities for improving staff performance in order management and a facility's response time.

Customs Clearance Cycle: This indicator measures the amount of time (e.g., minutes, hours, days, and weeks) from the moment the cargo arrives in the port or airport until the moment

that it clears customs, arrives at the warehouse, and is ready to be put away. This indicator can be calculated by product or supplier, or the average across products or suppliers, during a specified period of time.

Put-Away Time: This indicator measures the amount of time it takes from when a product(s) has been unloaded from a truck after arriving at a warehouse or other storage location to when it is stored in its designated place and is ready for picking. This indicator can be calculated by product, or by shipment, or as an average across products or shipments, during a specified period of time.

c) Cost/Financial

Total Warehousing Cost: The total warehousing costs collect all costs related to warehousing, such as labor costs and warehouse rent; or mortgage payments, utility bills, equipment, material- and information handling systems, etc. It also includes costs related to systems, supplies, and any other material with specific use in warehousing. This indicator is usually measured annually.

Value of Product Damaged in the Warehouse: This indicator calculates the value of products damaged, during a defined period of time (usually one year), in the warehouse as a percentage of the value of all shipped products during that period.

d) Productivity

Storage Space Utilization: Storage space utilization indicates the percentage of the total storage space actually being used out of the total storage space available.

Units Moved Per Person-Hour: This indicator measures the number of units (e.g., boxes, pallets) or weight moved during a defined period of time, per person-hour, for each person working during that period. It can be considered both when receiving and shipping inventory.

Percentage of Storage Space Dedicated to Product Handling: This indicator measures the percentage of total storage area that is dedicated specifically to product handling (receiving, unloading, packing, loading, and dispatching).

Organizational Performance

Organisational Performance (OP) lies at the heart of a firm's survival. Performance refers to an individual ability, skill and effort in a given situation (Porter and Lawler, 1974).

Performance is the outcome of the effort extended to the job by an employee or group or organization. Effort is an internal force of a person which makes him or her to work willingly. When employees are satisfied with their job and their needs are met, they develop an attachment to work or make an effort to perform better. Pushpakumari (2008) defined organizational performance as an organizations' actual output or results as measured against its intended outputs (or goals and objectives). It also relates to how successfully an organization performs or achieves their predetermined objectives and goals. Organizational performance generally covers three explicit areas of firm outcomes which are: financial performance (profits, return on assets, return on investment, etc.), product market performance (sales, market share, etc.) and shareholder return (total shareholder return, economic value added, etc.).

The measure of performance may be objective (available in financial statements) or perceived/subjective. The use of subjective measure is common practice in strategy related research when financial statement data are unavailable or they do not allow for accurate comparisons amongst firms (Protogerou et *al* 2012). Performance in an organization can be measured in two main ways: subjective and objective. Subjective measures are based on opinion or estimates provided by respondents who usually are asked to assess company performance (Narver and Slater, 1990). Jaafreh & Al-abedallat, 2013, "classified the organizational performance into five categories: Customer evaluation of product and services, human resource result, supplier and partner performance, financial and market result and organizational effectiveness results" (p.99). There are two main reasons for using subjective performance measures: First, subjective measures are often preferred because of difficulties of collecting objective performance data from small firms. Second, there is a correlation between subjective and objective measures of performance (Tsai et *al*., 2010).

Organizational performance is broader concept encompassing both financial performance and operational performance indicators. It is defined in both financial and non-financial context; financial indicators of the performance of an organization are the return on investment (ROI) and return on Assets and non-financial indicators like product or service quality, market share, customer loyalty and customer satisfaction (Zaman et *al*., 2012). "hard" financial indicators, such as return on investment and share price, however are more applicable to private, for-profit organizations than the public sector like Disaster Risk Management Commission. Therefore, "soft" indicators indicating employee satisfaction, morale and

attitudes as perceived by employees measure the organizational effectiveness (Sitlington & Marshall, 2011; Lai, 2012).

Customer needs can be fulfilled properly if the warehouses can efficiently perform their operations which can also boost the performance of the parent organization (Jermsittiparserta, Sutduean, & Sriyakul, 2019). Efficiency in warehousing is a key success factor, because it ensures the seamless flow of goods and services in a complex supply chain (da Costaa, Camposb, & Bandeirab*, 2012). Customer satisfaction can be defined as a customer overall evaluation of the performance of an offering to date. This overall satisfaction has a strong positive effect on customer loyalty intention across a wide range of product and service categories (Gustaffasson, 2005). Employees of an organization can understand the satisfaction level of their donors and/or beneficiaries and act in a way that focuses on key performance issue in the organization's operations. Efficiency of a warehouse must address and meet beneficiaries, donors and stakeholders requirement and consequently reconnects to customer satisfaction.

2.2. Empirical Review

A case study in determining key performance indicators for warehouse performance measurement by (Kusrini*, Novendri, & Helia, 2018) stated that, if a warehouse performance is good, the quality performance, delivery time, customer satisfaction will improve on the other hand cost in logistics system will reduce. Hence, Warehouse activity improvement can be done based on the most important KPI- cost/financial, productivity, quality and cycle time in each activity.

Though, on their study, they stated that different types of warehouse require different indicators/metric, they use 25 KPI of warehouse in five warehouse activities based on Frazelle model. They tried to answer the question that which performance indicator is essential for warehousing activities and facilitate warehouse managers in determining strategies and actions to improve warehouse performance. They concluded in their study that for warehousing activities- receiving, put away, order picking, and shipping the most important KPIs are productivity (receive per man-hour), cycle time (put away cycle time), cycle time (order picking cycle time) and productivity (order prepared for shipment per man-hour) respectively.

According to a study by (Bogale, 2016)- Assessment of warehouse performance: A case of Ethiopian Trading Enterprise using a suggested Edward Frazelle (2001) warehouse key

performance indicators, namely Quality, response time, total warehouse cost/financial, and productivity. The study concluded that warehouse performance was moderate in terms of the four key performance indicators. It has also revealed that, the measurement of the warehouse performance based on dimension of response time is comparatively better.

A study by (Simchi-Levi, D., Kaminsky, P. and Simchi-Levi, E., 2004) stated that warehouses are very crucial for the seamless flow of goods and information in a supply chain. Since goods and information are going in and out from the warehouses, there should be a system /technology that facilitate those activities. Moreover, communication platforms (software) help to make a wise decision (Kusrini, Novendri, & Helia, 2018).

According to Kusrini, Novendri, & Helia, 2018 A warehouse performance measurement is a way to measure activity performance, program or service performed in warehouses. Though there are many methods for classifying warehouse performance measures, recently there is no universally accepted KPI for different types of warehouses.

A study by Lake (2020) entitled The Determinant of Warehouse Efficiency: In Case Of Heineken Brewery resulted that warehouse location design, inventory location, warehouse management system, and effective communication have a strong relationship with warehouse efficiency, which consequently contributes to organizational performance.

A similar study by Kibrom (2019) on the effect of warehousing on organizational performance through a case study of My Wish Enterprise Plc concluded that warehousing dimensions such as receiving activity, storage activity, picking activity, shipping activity and order picking have positive and significant relationship with organizational performance.

The researcher argue that the key warehouse operations namely receiving activity, put-away activity, storage activity, order picking/packing activity, and shipping activity were not given special attention and integrative approach to its causal association with organizational effectiveness. This study will add to the practices and literature on warehouse operations and more importantly fill the gap in uncovering the underlying relationships between warehouse operations and organizational performance. Thus, further characterizing these activities and its contribution to organizational performance in a different organizational setting in general and in humanitarian organization such as DRMC Adama, in particular will add value to empirical data in the area.

2.3. Conceptual Framework

The warehouse operation environment conceptual framework reveals the hypothetical interaction of the major actors that are involved in the warehouse operations namely; Receiving, Put-away, Storage, Order Picking/Packing, Shipping, and the overall organizational performance (productivity). The study attempted to examine the association and possible impact that the key warehouse operations have on organizational performance from employees' perspective in terms of cost effectiveness, client satisfaction, goal attainment, etc.

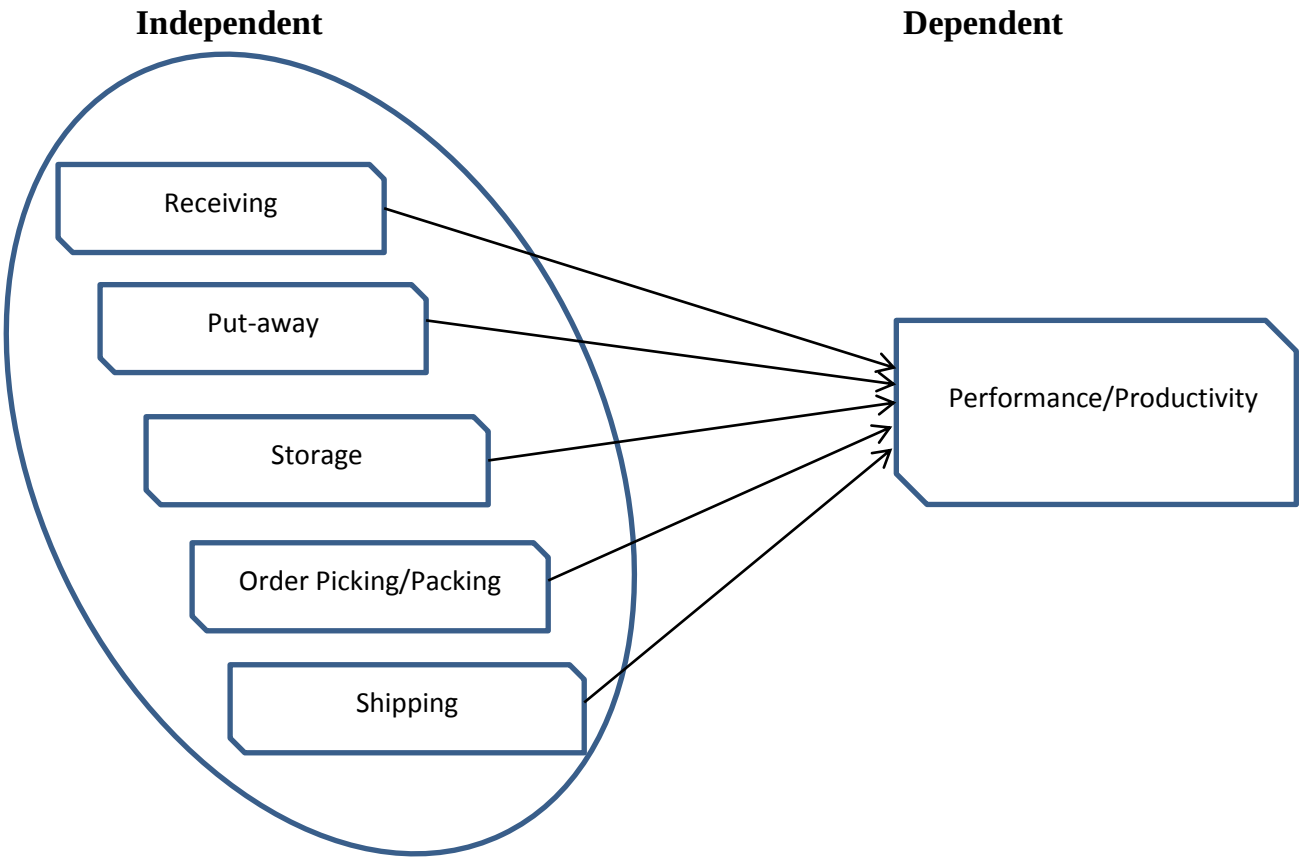

Figure 1 Warehouse key Operations-Productivity Relation

(Based on and modifying Aronovich, Dana, Marie Tien, Ethan Collins, Adriano Somme Latte, And Linda Alani. 2010)

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 The Study Area

The study aimed at explaining key warehouse operations and their impact on organizational performance in the case of EDRMC Adama. The organization is responsible to providing appropriate and timely responses to disaster before, during and after the disaster period at all levels through establishing a coordinated, accountable and decentralized system in scalable manner. EDRMC Adama branch is used as a hub containing 24 large warehouses with a capacity of storing 500 quintal each, i.e. a total capacity of 1.2 million kilograms. However, the branch has no forklift or machinery to carry out warehouse operations, food items and oil are the main items in the warehouse, in addition almost no IT support of the warehouse activities and information processing is carried out manually. The transport logistics is mainly supported by the WFP to customers at different targets.

3.2. Research Approach and Design

3.2.1. Research Approach

The mixed method (qualitative and quantitative) approaches were used in the study. The use of quantitative and qualitative approaches in combination for a study gives a better picture of research problems and complex phenomena than either approach alone (Molina-Azorin, 2016).

3.2.2. Research Design

A research design provides a framework for the collection, organization and analysis of data. According to Singh (2006), research design is essentially a statement of the object of the inquiry and the strategies for collecting and analysing the evidences and reporting the findings.

Proper research design is crucial for a research to be carried out successfully. The main reason of research design is to covert a research problem into data for analysis purpose and to give relevant answers to research questions at lowest possible cost. Survey method is a method among different types of research that gives a numeric description of different attributes/variables of a population by studying a sample of it (Asenahabi, 2019).

Further, the survey method can be used for descriptive, exploratory and explanatory research. A research based on its purpose can be descriptive (which focuses on the determination of the frequency with which an event occurs and how variables are related/associated in a particular context) or explanatory (concerned with determining the impact and cause and effect relationships among variables) types of research.

The key activities in warehouse operation are explanatory variables that were assessed for the level of implementation possibly characterizing them by time, quality, cost and productivity. The employees opinion/perception on the overall organizational performance was the response variable. The research aimed at uncovering the relationship (possibly cause-effect type) between these constructs. Therefore, this study used both descriptive survey and explanatory design using correlation and regression models in characterizing warehouse operations and its linkage to organizational performance.

3.2.3. Target Population

The organization has a total of 243 permanent employees in different departments in addition to 3 managers, 4 quality controllers, and 22 warehouse supervisors. An overview of the permanent employees work experience revealed that 71 of them were below 1 year of work experience in the company. In order to fairly address the research questions and keep its validity, the researcher determined to consider the 172 (243-71) experienced employees only and the other aforementioned supervisors and managers as population units.

3.2.4. Sample Size and Sampling Design

The researcher considered that the targeted population would have a clear understanding of basic warehouse operations, thus from the entire targeted population the 3 managers, 4 quality controllers and the entire 22 warehouse supervisors are included in the sample for their valuable and direct involvement in the problem area, and a sample size formula was used to select samples from the 172 permanent employees. To determine the sample size the researcher used Kothari's (2004) sample size formula as follows:

$$n = \frac{z^2 * p * (1-p) * N}{e^2 * (N-1) + z^2 * p * (1-p)}.$$

Where: n = required sample size

Z^2= this is the abscissa of the normal curve that cuts of an area α at the tails (1-α equals the desired confidence level. Here Z=1.96 at 95% confidence level; and Z^2=3.841).

N = the population size which is 172 in our case.

p = the population proportion (assumed to be 0.5, this would provide the maximum sample size)

e = is the desired level of precision or margin of error (5% error or 0.05)

Thus, the formula gives us a sample size to be 119.

The researcher determined to select 119 respondent employees by using probabilistic (simple random) sampling technique from the 172 permanent employees. The technique used to select the respondents was made by first assigning the respondents roll number, then drawing the roll number randomly from the list until the desired (119) is reached. In addition 4 key informants (2 from supervisors, 1 senior manager and 1 quality controller) were judgementally selected for interview.

3.2.5. Data Source

This survey study used both primary and secondary data. Primary data is one which the researcher directly collects from the source while secondary one is obtained from published documents or others which are not produced by the researcher. Responses from survey questionnaire and interview of key informants were primary data while data from the target organization's repository such as published documents, reports, or web site were basically secondary and used to enrich background information and practices of the organization in the desired research topic/area.

Both primary and secondary sources of data were used to gather relevant information for this study. The primary data were collected using questionnaires and key informants interviews.

3.2.6. Data Collection Method

Questionnaire: Self-administered structured questionnaire adopted from similar studies and reviewed literature regarding key warehouse operations and overall organizational performance on a five point Likert scale were used as the main survey instrument for collecting primary data.

Interview: an in-depth interview was conducted to obtain sufficient information about the operational efficiency of the warehouse and its impact on organizational performance. This was done with the warehouse manager, supervisors and quality heads.

3.2.7. Method of Data Analysis

The study applied both quantitative and qualitative approach for data gathering and analysis. The data collected using questionnaires was analysed using SPSS v23 software. In doing so, descriptive summary were reported such as frequency tables, the mean and standard deviation. Moreover, correlation and regression analysis were used to describe bivariate associations and explain the cause effect relationship, respectively.

Summary of qualitative data analysis helped in triangulation of the findings obtained through quantitative method using questionnaire.

Correlation

Correlation analysis is commonly applied to uncover the nature and degree of linear relationships between variables if any. Pearson product moment correlation model is the most popular type in this regard. The Pearson correlation coefficient falls between -1 and +1 inclusive with -1 a perfect negative (the two variables oppositely moving) and +1 a perfect positive (the two variables moving in the same direction) relationship, and a value 0 means the absence of linear association. General range for strength of association could be taken as low (0.0 - .30), moderate (.31 - .60) and strong (above .60) (Hof, M., 2012). The Pearson correlation model was used in this study after screening the distributions for normality.

Regression

Linear Regression Model is used to characterize the cause-effect type of relation between dependent (organizational performance in the case of this study) and independent variables (the warehouse key operations practiced in the organization). The main prerequisites (assumptions) for a regression model to be applied were also being tested.

Sample Size: Stevens (1996) as cited in Julie (2010), for a multiple regression in social science and business study a sample size equal to at least 1:15 ratio of independent variable to subject ratio is needed i.e. at least 15 cases for each independent variable is needed.

Normality: the residuals (the difference between the predicted dependent value and observed value) should be normally distributed about the predicted dependent variable scores (Julie, 2010).

Multicollinearity: Two independent variables should not be highly correlated (r=.9 and above) with each other (Tabachnick and Fidell, 2001 as cited in Julie, 2010).

Homoscedasticity: the variance of the residuals about predicted DV scores should be the same for all predicted scores.

The regression model in the case of this study has the following form:

$$\mathbf{Y = a + b_1\,REC + b_2\,PTA + b_3\,STR + b_4\,OPP + b_5\,SHI + \varepsilon}$$

Where Y is organizational performance (dependent variable)

REC - receiving activity

PTA - put-away activity

STR- storage activity

OPP – order picking/packing

SHI - shipping activity

a, $\mathbf{b_1, b_2, b_3, b_4, b_5}$ constant term/multiple coefficients

ε is the error term

3.3. Reliability & Validity

Validity and reliability refers to the routine measures to assure its validity and reliability as major attributes of data quality.

Validity is defined as the extent to which an assessment accurately measures what it is intended to measure (Drost, 2011). It generally refers to how accurately a conclusion, measurement, or concept corresponds to what is being tested (Drost, 2011). There are three types of validity for assessment purposes namely face, content, and construct validity (Hof, 2012). Face Validity indicates how the test looks like a measure of the construct of interest. Possible advantage of face validity is if the respondent knows what information we are looking for, they can use that "context" to help interpret the questions and provide more useful and accurate answers. Content Validity shows how the test contains items from the desired content domain (Drost, 2011). Or it looks at whether the instrument adequately covers all the content that it should with respect to the variable (Drost, 2011). In this regard an in-depth review of related works and theory, advisor's continuous feedback, experts and

university academicians' comments on the overall research process in general and, data collection tools in particular helped to achieve the validity of the research in different angles.

Reliability refers to the repeatability of findings on consistence, stability, or dependability of the data. The reliability of an instrument is increased by identifying the precise data needed and repeated use of the instrument in field testing.

Internal consistency of the instrument is tested by Cronbach's alpha measure. The coefficient of reliability falls between 0 and 1, with perfect reliability equalling 1, and no reliability equalling 0. The general rule is that reliability greater than or equal to 0.7 are considered as fairly enough (Drost, 2011). The researcher tested the instrument's reliability level (internal consistency) using Cronbach's alpha coefficient with the values shown in Table 1 for each warehouse operation constructs and organizational performance.

Table 1 Instrument's Reliability Statistics

Construct	**Cronbach alpha (α)**	**# of Items**
Receiving	.862	5
Put-away	.715	5
Storage	.849	5
Order Picking/Packing	.824	7
Shipping	.802	4
Organizational Performance	.796	5

Source: Author's Survey 2022

As can be seen from Table 1 all the Cronbach alpha coefficients are above .7 indicating that the instrument is internally consistent, means that items in each category are of the same construct.

3.4. Ethical Consideration

The researcher fairly addressed ethical issues such as confidentiality and privacy. Respondents' demographic information as well as responses were kept confidential and used only for the intended academic purpose. The researcher ensured that the study shall not have

any psychological, social or physical impact on individual respondents. Informed consent was given on the understanding that the participant need to be volunteer and can change his or her mind about taking part in the study at any time.

CHAPTER FOUR
RESULTS AND DISCUSSIONS

This chapter presents the survey results including demographic information of respondents, descriptive & inferential statistics and discussion on the effect of warehouse operations on organizational performance in the case of Ethiopia Disaster Risk Management Commission (EDRMC), Adama Branch.

4.1 Background Information of the Respondents

The survey respondents were employees of Ethiopia Disaster Risk Management Commission, Adama Branch. Demographic characteristics of the respondents which include gender, age, educational level, employee role and work experience are shown in Table 1 and the contents are subsequently discussed.

Table 2 Demographic Information of the Respondents (N=119)

	Value	Frequency	Percent	Cumulative Percent
Gender	Male	77	64.7	64.7
	Female	42	35.3	100.0
Age Group (in years)	18-25 years	32	26.9	26.9
	26-35 years	22	18.5	45.4
	36-45 years	36	30.3	75.6
	above 45 years	29	24.4	100.0
Education	Secondary level	26	21.8	21.8
	College diploma/TVET	30	25.2	47.1
	First Degree (BSc, BA)	46	38.7	85.7
	Masters Degree	17	14.3	100.0
Experience	1 to 2 years	32	26.9	26.9
	3 to 5 years	31	26.1	52.9
	6 to 9 years	38	31.9	84.9
	10 or more years	18	15.1	100.0

Source: Author's Survey 2022

The socio-demographic characteristics of the respondents have distinction among the respondents. As depicted in Table 1, 64.7% (77) of the respondents were males and the remaining 35.3% (42) females. The gender distribution thus shows disproportionality of male and female. It seems that male employees dominate EDRMC, Adama branch during the course of this study.

32 of the respondents fall in the age range of 18 - 25 years (which is 26.9%) and 22 respondents i.e. 18.5% falls in 26 – 35, 36 respondents (30.3%) fall in the age group of 36 – 45 years. The remaining 29 i.e. 24.4% fall in the above 45 years age group. Thus, the age distribution could tell us that the respondents were matured enough to fairly address the organizational issues.

Regarding the highest level of educational qualification, 26 (21.8%) of the respondents were secondary level, 30 (25.2%) had college diploma or TVET, 46 (38.7%) of the respondents had first degree, and the remaining 17 (14.3%) had masters degree. The educational background of the respondents was also good enough to appropriately attempt the research questions.

The other important demographic characteristic was the respondents' experience in their respective roles/activities and position. 32 (26.9%) of the respondents had a work experience of 1 to 2 years, 31 (26.1%) of them had 3 to 5 years of work experience. 38 (31.9%) of the respondents had a work experience of 6 to 9 years and the remaining 18 (15.1%) respondents had 10 or more years of work experience. Nearly 53% of the respondents had a work experience of 5 years, this may alarm significant employees turnover compared with the organization's age. Generally, the work experience distribution consists of practitioners that could fairly address the issues raised in this study.

4.2 Descriptive Results

In this section the selected employees' response (opinion) on key warehouse operations and their perceived performance level of the organization, EDRMC, is described. The statistical figures presented are based on the self-administered structured questionnaire items measured on a 5 point Likert scale (ranging from: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree). The descriptive statistics used are mean, standard deviation and standard error.

Table 3 below shows the descriptive statistics on the aforementioned constructs. The following rule (cut off points) is used in interpreting the statistical mean figures on employees' perception to have common understanding on the various constructs.

Between 3.10 and 3.50 only average/undecided (equally agree and disagree)
Between 3.51 and 4.00 good level of agreement
Between 4.01 and 5.00 high level of agreement

Table 3 Descriptive statistics for Receiving Operation

Item	Mean		Std. Dev.
	Statistic	Std. Error	Statistic
Our warehouse is able to receive the right product, in the right quantity, in the right condition, and at the right time	3.52	.090	.982
The warehouse is always ready to the transfer of responsibility for the goods to the warehouse	3.71	.087	.951
Our warehouse workers perform appropriate inspections of goods at receiving stage.	3.64	.087	.945
The warehouse uses standard operating procedure for receiving of goods	3.71	.085	.922
Our warehouse workers confirm all the goods arrived are perfectly matched with what originally ordered	3.66	.088	.959
Overall	3.65	.070	.764

Source: Author's Survey 2022

Receiving as way of transferring responsibility for the goods to the warehouse would play an important role to receive cargo efficiently and correctly and to avoid accumulation at the receiving docks. Thus, receiving activity as an important first warehouse operation is characterized five attributes as shown in Table 3. From the statistical figures respondents witnessed/agreed adequately that the warehouse was able to receive the right product, in the right quantity, in the right condition, and at the right time (Mean = 3.52, SD = .982). Respondents also experienced equally at good level that the warehouse was always ready to the transfer of responsibility for the goods to the warehouse (Mean = 3.71, SD = .951), and the warehouse used standard operating procedure for receiving of goods (Mean = 3.71, SD = .922). The warehouse workers also performed appropriate inspections of goods at receiving stage (Mean = 3.64, SD = .945). In addition, the warehouse workers confirmed that all the goods arrived were perfectly matched with what originally ordered (Mean = 3.66, SD =

.959). Generally, the receiving activity was performed at reasonably good level (Mean = 3.65, SD = .764). Relatively, the lower standard deviation value indicates consistency in the response and the standard error values show the closeness/reliability of the mean value to the actual receiving activity characterized in EDRMC.

Table 4 Descriptive statistics for Put-away Operation

Items	Mean		Std. Dev.
	Statistic	Std. Error	Statistic
In put-away safety of goods and employees is ensured	3.52	.106	1.156
Warehouse space utilization is maximized so that moving goods, workers and machineries is easier	3.52	.099	1.080
Warehouse personnel are skilled to perform put away activities	3.18	.117	1.275
Cargo is easier and faster to find, track, and retrieve	3.56	.099	1.079
The put-away is primarily done manually with the help of significant number of labors	3.75	.089	.967
Overall	3.51	.070	.761

Source: Author's Survey 2022

Put-away is as an important warehouse activity after receiving cargo in warehousing operations. This activity was characterized by five attributes whose description and respondents experience in statistical figures is depicted in Table 4 above. Employees fairly agreed/experienced that safety of goods and employees themselves to be ensured (Mean = 3.52, SD = 1.156), and they also noted (moderately agreed) that warehouse space utilization was maximized so that moving goods, workers and machineries is easier (Mean = 3.52, SD = 1.080). However, respondents did not fairly agree (undecided) if warehouse personnel were skilled enough to perform put away activities (Mean = 3.18, SD = 1.275). The respondents well agreed that cargo was easier and faster to find, track, and retrieve (Mean = 3.56, SD = 1.079) as there were limited food items with no complexity to the put-away activity. The respondents were also well agreed in that the put-away was primarily done manually with the help of significant number of labors (Mean = 3.75, SD = .967). From the overall mean value of the put-away activity (Mean = 3.51, SD = .967), the movement of goods from the receiving dock to the most optimal warehouse storage location was good but not yet the best. The total manual operation with no forklifts and rails may contribute to this.

Table 5 Descriptive statistics for Storage Operation

Item	Mean		Std. Dev.
	Statistic	Std. Error	Statistic
Our warehouse teams are effective in minimizing total goods damage that are stored in the warehouse	4.09	.052	.567
Most of the time in our warehouse, items are placed in the correct location or bin	4.07	.061	.660
Most of the time our warehouse personnel utilizes warehouse spaces properly	4.01	.063	.683
Most of the time our warehouse or storage locations has no inventory discrepancies when bin cards were compared to a physical inventory count.	3.89	.081	.881
A unique address is assigned to every single location in a warehouse, regardless if it's dedicated or shared location	3.84	.086	.939
Overall	3.98	.055	.600

Source: Author's Survey 2022

Storage is key operation in warehouse management. This activity was also characterized using five attributes as shown in Table 5. Statistical figures tell that respondents highly agreed on storage activities done in DRMC Adama in that the warehouse teams were effective in minimizing total goods damage that were stored in the warehouse (Mean = 4.09, SD = .567), Most of the time in the warehouse, items were placed in the correct location or bin (Mean = 4.07, SD = .660), and the warehouse personnel utilized warehouse spaces properly (Mean = 4.01, SD = .683). There was also high agreement among respondents that most of the time the warehouse or storage locations to had no inventory discrepancies when bin cards were compared to a physical inventory count (Mean = 4.01, SD = .683), a unique address was assigned to every single location in a warehouse, regardless if it's dedicated or shared location (Mean = 4.01, SD = .683). From the overall mean value and the standard statistics (Mean = 3.98, SD = .600, Std. Err=.055), the storage activity was really effective and this was consistently witnessed by the respondents. Here the more goods are placed into their most appropriate storage space contributes to the easier movement within the storehouses, and easy stock access which in turn brings improved employees efficiency.

Collecting the correct products in a warehouse to correctly fulfil customers order is key activity to the overall warehouse performance as it is costliest process comprising as much as 55% of the total operating expense. In addition, consolidating picked items in quantity and

type and preparing them for shipment is an integrative warehouse operation. These and the like activities were characterized by 7 items as shown in Table 6 along with descriptive statistics.

Table 6 Descriptive statistics for Order Picking/Packing Operation

Items	Mean		Std. Dev.
	Statistic	Std. Error	Statistic
Most of the time in our warehouse items or lines are picked accurately (i.e., the correct items and quantities) from storage based on a request, and then placed into the appropriate truck	3.79	.091	.990
Our warehouse has adequate equipment to facilitate order picking process on the reasonable time.	3.41	.094	1.027
Our warehouse gives as much focus on order picking process to reduce costs significantly for it shares the greater operating expense	3.35	.102	1.115
The warehouse personnel are skillful in performing order picking process	3.53	.094	1.030
Our packing process ensures that damages are minimized from the time items leave the warehouse.	3.73	.086	.936
Our warehouse effectively consolidates picked items in a sales order and prepares them for shipment to the customer	3.52	.093	1.014
Our warehouse's inventory management system facilitates the order picking and packing process	3.47	.085	.925
Overall	3.54	.064	.703

Source: Author's Survey 2022

Among these attributes, respondents well agreed on two items such that warehouse items or lines were picked accurately (i.e., the correct items and quantities) from storage based on a request & then placed into the appropriate truck (Mean = 3.79, SD = .990), and the packing process ensured that damages were minimized from the time items leave the warehouse (Mean = 3.73, SD = .936). The support of WFP in this regard may contribute to improve these activities. Also well agreed that warehouse personnel were relatively skillful in performing order picking process (Mean = 3.53, SD = 1.030), and the warehouse effectively consolidated picked items in a sales order and prepares them for shipment to the customer (Mean = 3.52, SD = 1.014). However, the respondents were in doubt and did not agreed well that the warehouse had adequate equipment to facilitate order picking process on the

reasonable time (Mean = 3.41, SD = 1.027), the warehouse gave as much focus on order picking process to reduce costs significantly for it shares the greater operating expense (Mean = 3.35, SD = 1.115)., and the warehouse's inventory management system facilitated the order picking and packing process (Mean = 3.47, SD = .925). Summarizing this, DRMC Adama moderately performs (Mean = 3.54, SD = .703) on order picking and packing activities which ultimately play important role to the overall efficiency and effectiveness of the warehousing operation.

The final activity in the warehouse operation is shipping which is greatly affected by the put-away, picking, and packing activities. This activity is characterized by four important attributes with the respective statistical figures as shown in Table 7.

Table 7 Descriptive statistics for Shipping Operation

Items	Mean		Std. Dev.
	Statistic	Std. Error	Statistic
Most of the time, goods are delivered to the company customers as per the orders specification	3.50	.091	.997
Most of the time our warehouse personnel perform perfect order delivery lead time to the company customers.	3.71	.079	.863
Our warehouse monitors the order processing time to improve the efficiency of a shipping facility	3.56	.083	.905
Warehouse personnel perform perfect order delivery lead time to the company customers	3.64	.085	.930
Overall	3.60	.067	.733

Source: Author's Survey 2022

Three of the shipping attributes were fairly agreed by the respondents which are listed in order: Most of the time our warehouse personnel perform perfect order delivery lead time to the company customers (Mean = 3.71, SD = .863), Warehouse personnel perform perfect order delivery lead time to the company customers (Mean = 3.64, SD = .930), and Our warehouse monitors the order processing time to improve the efficiency of a shipping facility (Mean = 3.56, SD = .905). However, the item; Most of the time, goods are delivered to the company customers as per the orders specification (Mean = 3.50, SD = .997) was not well agreed (or respondents were in doubt) by the respondents. The overall shipping activities score (Mean = 3.60, SD = .733) was indicative of a fairly addressed shipping activities to be carried out in DRMC Adama and more yet to be done. At the heart of successful shipping

activity is sorting, loading the right order, dispatching the right customer, and safe & on time delivery to customers.

The identified warehouse activities are key elements of the warehouse system. They are interrelated a single missing/delayed/wrongly done activity can delay a whole warehouse operation, and could result in failure to respond timely to life saving critical requests from customers.

Employees are key role players and beneficiaries of organizational performance. In this regard employees rate the attributes whose perception may address the overall nonfinancial aspect of performance level of their organization. Table 8 shows selected five organizational performance items and their respective descriptive statistics.

Table 8 Descriptive statistics for Organizational Performance

Items	Mean		Std. Dev.
	Statistic	Std. Error	Statistic
Beneficiaries are satisfied with the products and services they offer	3.92	.061	.671
There is a significant reduction in total product damage and stock outs	3.90	.062	.678
The operations carried out are consistently measurable, cost effective, sensitive, and timely and mission related	3.89	.063	.685
Disaster risk issues are rapidly mobilized with timely dissemination of accurate information	3.55	.079	.864
My organization is doing in accordance with the stated intended outputs (or goals and objectives).	3.70	.074	.812
Overall	3.79	.051	.554

Source: Author's Survey 2022

Beneficiaries were satisfied with the products and services the organization offered (Mean = 3.92, SD = .671), there was a significant reduction in total product damage and stock outs (Mean = 3.90, SD = .678), and the operations carried out were consistently measurable, cost effective, sensitive, & timely and mission related (Mean = 3.89, SD = .685), were the top three performance issues well agreed by the employees. Respondents also agreed satisfactorily in that their organization was doing in accordance with the stated intended outputs (or goals and objectives) (Mean = 3.70, SD = .812), and disaster risk issues were rapidly mobilized with timely dissemination of accurate information (Mean = 3.55, SD =

.864). On average organizational performance perceived by the employees was good (Mean = 3.79, SD = .554).

It is conclusive that more properly and appropriately carried out and managed warehouse operations provides a consistent supply of material to beneficiaries. This in turn leads to improved organizational performance.

4.3 Relationship between Warehouse Operations and Organizational Performance

The basic warehouse activities are examined for association with organizational performance. Correlation analysis helps to describe the nature and degree of possible linear association between the warehouse efficiency and organizational performance. The Pearson product moment coefficients were used to uncover this relationship.

Table 9 Correlations

		REC	PTA	STR	OPP	SHI	PER
REC	Pearson Correlation	1	.167	.122	.175	.402**	.462**
	Sig. (2-tailed)		.070	.186	.057	.000	.000
PTA	Pearson Correlation		1	.257**	.396**	.586**	.486**
	Sig. (2-tailed)			.005	.000	.000	.000
STR	Pearson Correlation			1	.395**	.495**	.469**
	Sig. (2-tailed)				.000	.000	.000
OPP	Pearson Correlation				1	.478**	.487**
	Sig. (2-tailed)					.000	.000
SHI	Pearson Correlation					1	.710**
	Sig. (2-tailed)						.000
PER	Pearson Correlation						1
	Sig. (2-tailed)						

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

Source: SPSS output of Author's Survey 2022

The Pearson product moment coefficient of .462** ($p<.01$) indicates that receiving warehousing activity has a statistically significant moderate positive correlation with organizational performance. The implication here is that the better carried out the receiving activities is accompanied by improved organizational performance.

The figure .486** also indicates existence of a statistically significant (p<.01) moderate positive correlation between put-away and organizational performance. Again, effective and efficient put-away warehousing activity go hand with hand in better organizational performance.

The Pearson product moment coefficients .469** and .487** indicate that there was statistically significant (at .01 levels) moderate positive association between organizational performance and each of the storage and order picking/packing activities, respectively. It is conclusive that when there is effective and efficient storage and order picking/packing activities there is improved organizational performance.

Shipping is another important warehouse activity that has found important relationship with organizational performance. The value .710** signify existence of statistically significant and strong positive correlation between shipping and organizational performance.

In conclusion, each of the five warehouse activities namely receiving, put-away, storage, order picking/packing and shipping has a statistically significant positive association with organizational performance. These results were inline with the findings of the study by Kibrom (2019) where each of receiving, put-away, storage, order picking/packing and shipping activities statistically and significantly affect organizational performance of My Wish Enterprise in a positive manner. The result was also supported by the findings of Hoda and Andreas (2015) where the better warehouse operational efficiency could bring employees efficiency and consequently contribute to organizational performance.

A standard multiple regression model was employed to exploit the data distribution for cause-effect relationship between the key warehouse activities and organizational performance. Before delve into the model important pre-requisites for the regression model were first tested with the results described below.

The **sample size** was 119 with the 5 warehouse activities as independent constructs which is more than the minimum requirement (far more than 50) for multiple regression.

Normality of the residuals: This was also verified from the Normal P-P Plot with the predicted cumulative probability vs observed cumulative probability following a rising diagonal line as shown in Appendix A.

Multicollinearity and Serial Correlation: From the VIF values in the regression coefficients table below, the maximum value is 2.308 implying no problem of

multicollinearity. In addition the Durbin-Watson value of 1.554 indicates absence of serial correlation.

Heteroscedasticity: From the scatter plot shown in Appendix B, the dots are densely populated vertically around the value 0 and horizontally mainly between -3 and +3 indicates no hetroscedasticity problem or there is a constant variance in the residuals for each predicted dependent variable score.

The standard multiple regression procedure using the SPSS v23 has the following important outputs among others.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.770[a]	.594	.576	.36060	.594	33.019	5	113	.000	1.554

a. Predictors: (Constant), SHI, REC, OPP, STR, PTA

b. Dependent Variable: PER

From the model summary table above, the five warehousing operations combined can predict leadership practices combined can predict organizational performance by nearly 58% (R square value). That is around 58% of the variation observed in organizational performance is accounted for by the key warehouse operations.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.468	5	4.294	33.019	.000[b]
	Residual	14.694	113	.130		
	Total	36.162	118			

a. Dependent Variable: PER

b. Predictors: (Constant), SHI, REC, OPP, STR, PTA

The ANOVA table above provides an F-test ($F(5, 113) = 33.019$, $p < .001$) revealed the statistical significance (appropriateness) of the estimated model in describing the cause-effect relationships of the two groups of variables. Thus it can be concluded that warehouse operations significantly and positively affect organizational performance.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.805	.280		2.872	.005		
	REC	.172	.048	.238	3.595	.000	.822	1.216
	PTA	.082	.055	.113	1.498	.137	.628	1.593
	STR	.142	.066	.154	2.161	.033	.710	1.408
	OPP	.117	.056	.148	2.088	.039	.715	1.399
	SHI	.303	.069	.401	4.399	.000	.433	2.308

a. Dependent Variable: PER

The coefficients table above consists of important figures that explicitly parameterize the cause-effect relationship between the independent-dependent variables. From the unstandardized B coefficient value of .172 it is clear that an increase/improvement in receiving (REC) activity improves/increases organizational performance by .172 holding all other warehouse activities fixed.

The coefficient B=.082 indicates a relationship such that a unit increase/improvement in put-away warehouse activity causes an increase of the organizational performance by .082 but this result was not statistically significant at .05 level.

The other B value of .142 indicates that a unit increase/improvement in storage (STR) efficiency of the warehouse operation causes an increase of organizational performance by .142 holding the other warehouse activities constant. Thus, storage activity positively and significantly affects organizational performance of DRMC Adama. This result is supported by Kibrom (2019) where each of receiving, put-away, storage, order packing, and shipping statistically significantly affect organizational performance in the case of My Wish Enterprise, and the study by Charles and Makori (2017) in which storage/stock control has a strong positive impact on organizational productivity in state corporations.

Order picking/packing (OPP) warehouse activity has also positive impact on organizational performance. The B =.117 value indicates that a unit improvement in the order picking/packing accuracy causes a .117 increase of organizational performance. This result coincides with the findings of Muhalia, Patrick and Makori (2021) in which operational warehouse management systems involving storage and order picking/packing activities

positively and significantly influences the supply chain performance of fast moving consumer goods manufacturers.

Similarly the B=.303 value shows that an increase /improvement in the shipping (SHI) warehouse activity essentially causes an increase in organizational performance by .303 holding all the other independent variables constant. The result was inline with the findings of the study by Kibrom (2019) where each of receiving, put-away, storage, order packing, and shipping statistically significantly affect organizational performance in the case of My Wish Enterprise.

Thus, from the regression result each of the key warehouse operations practiced in DRMC Adama significantly affect organizational performance in a positive manner. The five key warehouse operations; receiving, put-away, storage, order picking/packing and shipping combined can explain about 58% of organizational performance.

From an interview session with key informants involving two supervisors, one warehouse manager and one quality controller important insights were made regarding warehouse operations and organizational performance. For an interview question on the practiced warehouse operations in DRMC Adama, all said that basically receiving, put-away, storage, order picking/packing and shipping were basic operations carried out in the warehouses. The activities were practiced in accordance with existing procedures, rules and regulations. However compared with modern warehouses and their operations, the absence of IT support and machineries were learned to impair warehouse operational efficiency.

The second interview question was how do these operations affect performance of the commission? The interviewees stressed that proper implementation and management of activities ultimately play important role in the successful delivery of items to target area in terms of time, accuracy and quality, The interviewees noted that this success surely contribute to the stated objective of the organization primarily to rescue many lives. The respondents also added that operational efficiency to directly contribute organizational performance. Thus, they concluded that organizational performance for such humanitarian organization without effective and efficient warehouse operations to be a question of survival and against its ultimate objective. Thus, it can be said that the warehouse operations positively contribute to organizational performance.

The third question was to identify the challenges against effective warehouse operations towards organizational goal achievement by DRMC Adama. The interviewees pinpointed

that a weak monitoring and control of the warehouse activities, lack of standardizing activities and corresponding output in a measurable way, the total absence of use of information technology infrastructures and support system, unavailability of machineries such as forklifts, and lack of experienced personnel to be the major challenges and problems in the case of DRMC Adama. Apart from these, the interviewees stressed that employees were not provided with adequate training to build their capacity by the management and this could contribute to inefficient warehouse operations.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter summarizes the major findings of the study, conclusions that were made, and possible recommendations forwarded regarding the effect that warehouse operations had on organizational performance in the case of DRMC Adama.

5.1 Summary of Major Findings

This survey study was motivated with the objective of explaining the possible effect that warehouse operations had on organizational performance in the case of DRMC Adama. A randomly selected 119 permanent employees/respondents of DRMC Adama with various roles and responsibility participated in the survey in addition to interview of key informants from the organization. Primary data was collected from the respondents using a fully structured self-administered questionnaire on a five point likert scale characterizing the five warehouse activities and employees perceived organizational performance as well as from interview.

Descriptive results showed that DRMC Adama was performing well in the key warehouse operations especially in storage (Mean = 3.98) and receiving (Mean = 3.65) activities followed by shipping, Order Picking/Packing and put-away, respectively. These activities were characterized by being effective in minimizing total goods damage that were stored in the warehouse, placement of goods in the correct location or bin, utilizing warehouse spaces properly, using standard operating procedure for receiving of goods among others. Organizational performance as opined by the employees was good and even showed greater level of agreement by the respondents than many of the warehouse activities. This could account for by the wellness or part of warehouse operational efficiency.

In an effort to uncover the relationship between the five key warehouse activities and organizational performance, Pearson's correlation revealed existence of a statistically significant (at .01 level) positive association between organizational performance and each of the receiving, put-away, storage, order picking/packing, and shipping warehouse operations. The correlation was strongest between shipping and organizational performance.

From the interview session interviewees concluded that the five warehouse activities were practiced in accordance with existing procedures, rules and regulations, however compared with modern warehouses and its operations, the absence of IT support and machineries were learned to impair warehouse operational efficiency. They also underlined that successful warehouse operations (activities) to help the attainment of stated objective of the organization primarily to rescue millions of lives, and consequently the operational efficiency surely contribute to organizational performance.

From the regression result, each of the key warehouse operations practiced in DRMC Adama significantly (except for put-away) affect organizational performance in a positive manner. The five key warehouse operations; receiving, put-away, storage, order picking/packing and shipping combined can explain about 58% of organizational performance.

Close monitoring and control of each warehouse activity, standardizing activities in a measurable way, the use of information technology infrastructures and support system, acquiring machineries such as forklifts, and recruiting experienced personnel and providing employees with training to build their capacity were recommended to help improve warehouse operations.

5.2 Conclusion

This study gained important insights regarding the key warehousing practices and possible impact on organizational performance in the case of DRMC Adama. Based on the major findings from the study, the following conclusions were made.

DRMC Adama was more efficient in storage and receiving warehouse operations. Here the more goods are placed into their most appropriate storage space contributes to the easier movement within the storehouses, and easy stock access which in turn brings improved employees efficiency.

There is in general a fair level of warehouse operational efficiency yet much more to do and enhance to achieve organizational objectives. Specifically, there was lack of skilled personnel, total absence of forklifts and other machineries and no ICT support negatively impacts warehouse activities.

There is a positive significant association between warehouse operations namely; receiving, put-away, storage, order picking/packing, and shipping and organizational performance in the case of DRMC Adama.

By bringing operational efficiency in warehouse activities DRMC Adama can improve organizational performance and achieve its goals.

5.3 Recommendations

Based on the results and findings of this study, the following recommendations were forwarded to respective bodies.

The management of DRMC Adama need to apply additional effort to closely monitor and control each warehouse activity, and standardize activities in a measurable way

The management together with the federal government and other stakeholders need to device a mechanism to use information technology infrastructures and support system to better perform in warehouse operations to save lives.

Acquiring machineries such as forklifts and bar code readers would help to improve the efficiency of the activities in general and the storage and picking/packing operations.

Recruiting experienced personnel in the area helps to improve warehouse operational efficiency.

The management need to arrange experience sharing sessions with well known private or non governmental organizations such as WFP to share the best practices.

The management body need to provide employees with training specifically in the put-away and Order Picking/Packing activities to build their capacity to help improve warehouse operations.

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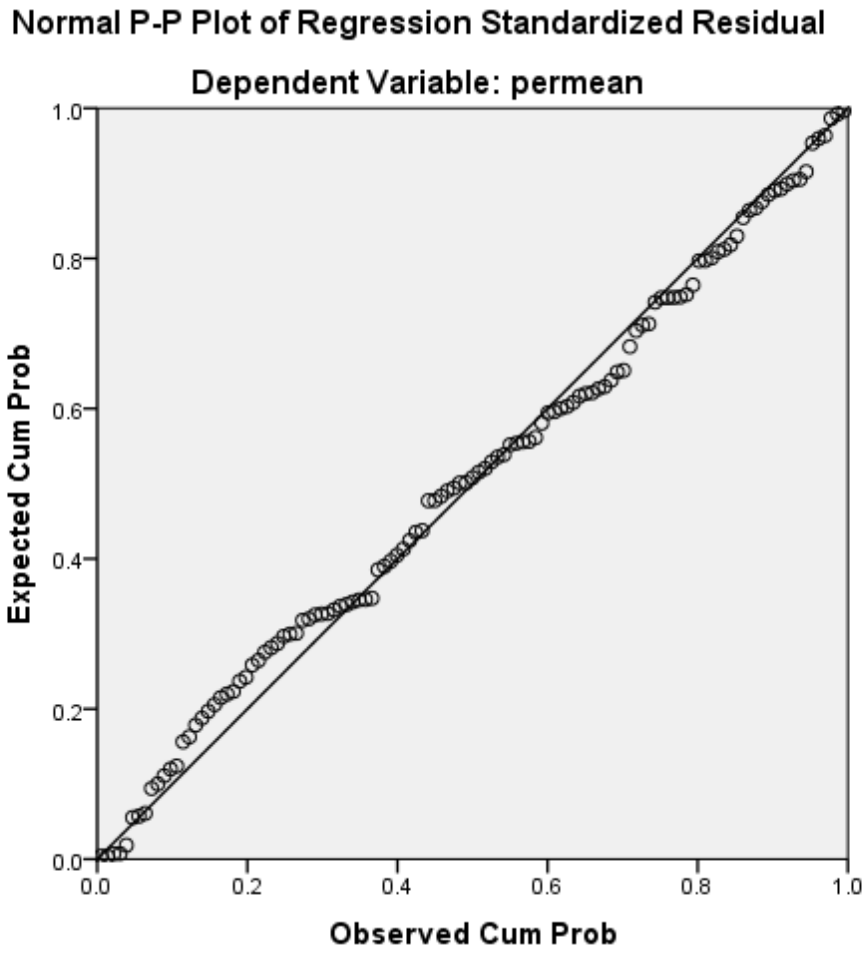
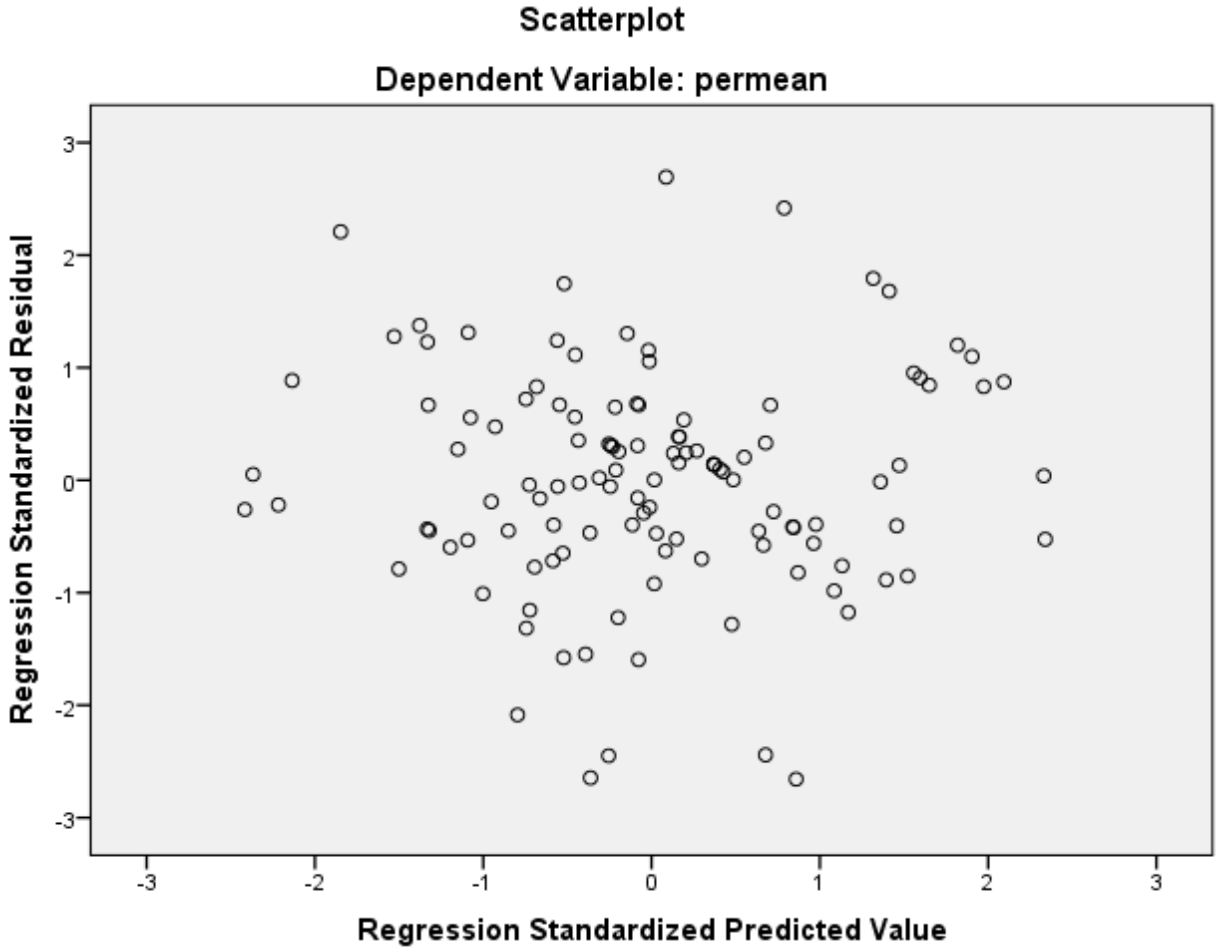
Appendices

Appendix A



Appendix B


Scatterplot
Dependent Variable: permean
Regression Standardized Residual
Regression Standardized Predicted Value
3
2
1
0
-1
-2
-3

Appendix C

QUESTIONNAIRE

ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Dear respondents,

I am so thankful for your help, dedication and kind cooperation to fill this questionnaire.

I'm a graduate student at Addis Ababa University School of Commerce in the Department of Logistics and Supply Chain Management. Currently, I'm conducting a research entitled '**The Effect of Warehouse Operations on Organizational Performance: The Case of Ethiopia Disaster Risk Management Commission At Adama Branch**' as a partial requirement for the award of Masters of Art Degree in Logistics and Supply Chain Management.

The purpose of this questionnaire is to gather data for the proposed study, and hence you are kindly requested to assist the successful completion of the study by providing the necessary information. Please do not write your name on the questionnaire. Your participation is entirely voluntary and the questionnaire is completely anonymous. I confirm you that the information you share will stay confidential and only used for the aforementioned academic purpose, thus not affects you in any way rather it will may help you in improving the performance of your company warehouse. So, your genuine, frank and timely response is vital for the success of the study.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me at 0911-152899 or fekadetariku@gmail.com.

Best Regards,

Fekade Tariku

General Information

Please put a tick mark (√) on the appropriate response category:

1. Gender: □ Male □ Female

2. Age:

□ 18-25 years □ 26-35 years □ 36-45 years □ above 45 years

3. Educational Qualification:

□ Secondary level □ College diploma/TVET □ First Degree (BSc, BA)

□ Second Degree (MSc, MA)

4. **Years of experience in the organization**

□ Less than 2 years □ 2 - 5 years □ 6 - 10 years □ above 10 years

Section II: Warehouse Operations Questionnaire

Please indicate your choice by putting the check mark **(√)** on the appropriate cell.

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

No.	Warehouse Operations	Score				
	Receiving	**1**	**2**	**3**	**4**	**5**
1	Our warehouse is able to receive the right product, in the right quantity, in the right condition, and at the right time					
2	The warehouse is always ready to the transfer of responsibility for the goods to the warehouse					
3	Our warehouse workers perform appropriate inspections of goods at receiving stage.					
4	The warehouse uses standard operating procedure for receiving of goods					
5	Our warehouse workers confirm all the goods arrived are perfectly matched with what originally ordered					
	Put-away	**1**	**2**	**3**	**4**	**5**
6	In put-away safety of goods and employees is ensured					
7	Warehouse space utilization is maximized so that moving goods, workers and machineries is easier					
8	Warehouse personnel are skilled to perform put away activities					

9	Cargo is easier and faster to find, track, and retrieve					
10	The put-away is primarily done manually with the help of significant number of labors					
	Storage	**1**	**2**	**3**	**4**	**5**
11	Our warehouse teams are effective in minimizing total goods damage that are stored in the warehouse					
12	Most of the time in our warehouse, items are placed in the correct location or bin					
13	Most of the time our warehouse personnel utilizes warehouse spaces properly					
14	Most of the time our warehouse or storage locations has no inventory discrepancies when bin cards were compared to a physical inventory count.					
15	A unique address is assigned to every single location in a warehouse, regardless if it's dedicated or shared location					
	Order Picking/Packing	**1**	**2**	**3**	**4**	**5**
16	Most of the time in our warehouse items or lines are picked accurately (i.e., the correct items and quantities) from storage based on a request, and then placed into the appropriate truck					
17	Our warehouse has adequate equipment to facilitate order picking process on the reasonable time.					
18	Our warehouse gives as much focus on order picking process to reduce costs significantly for it shares the greater operating expense					
19	The warehouse personnel are skilful in performing order picking process					
20	Our packing process ensures that damages are minimized from the time items leave the warehouse.					
21	Our warehouse effectively consolidates picked items in a sales order and prepares them for shipment to the customer					
22	Our warehouse's inventory management system facilitates the order picking and packing process					

	Shipping	1	2	3	4	5
23	Most of the time, goods are delivered to the company customers as per the orders specification					
24	Most of the time our warehouse personnel perform perfect order delivery lead time to the company customers.					
25	Our warehouse monitors the order processing time to improve the efficiency of a shipping facility					
26	Warehouse personnel perform perfect order delivery lead time to the company customers					
	Organizational Performance	**1**	**2**	**3**	**4**	**5**
27	Beneficiaries are satisfied with the products and services they offer					
28	There is a significant reduction in total product damage and stock outs					
29	The operations carried out are consistently measurable, cost effective, sensitive, and timely and mission related					
30	Disaster risk issues are rapidly mobilized with timely dissemination of accurate information					
31	My organization is doing in accordance with the stated intended outputs (or goals and objectives).					

Part II. Interview of Key Informants

1. How do you think are key warehouse operations carried out in DRMC?

2. How do these operations affect performance of the commission?

3. What are the challenges in the warehouse operations and possible mechanisms to best perform in warehouse operations and meet organizational goals of DRMC?