# Impact of Effective Warehouse Operations on Physical Distribution of Pharmaceutical Distribution Companies in Bamenda, Cameroon

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## 1. Introduction

Warehouse operations are a critical aspect of logistics and supply chain management in many industries worldwide. The efficient handling of inventory, space utilization, and accurate tracking of products are essential for organizations to meet customer demands and remain competitive in the global market (Mangan, 2016). The use of advanced technology such as warehouse system systems (WMS) has enabled companies to optimize their warehouse operations and improve their physical distribution process.

In developed countries, efficient warehouse operations play a critical role in the overall supply chain management process (Rao & Holt, 2005). Effective warehouse operations can contribute to improved customer satisfaction, reduced costs, enhanced inventory management, and streamlined physical distribution processes (Popa, 2012). Efficient receiving processes ensure timely and accurate receipt of goods into the warehouse. This includes verifying the quantity and quality of incoming shipments, inspecting for damages, and updating inventory records. Effective receiving activities help minimize delays and errors in the subsequent distribution process. Proper put-away procedures involve organizing and storing received goods in designated locations within the warehouse. Optimal put-away practices ensure that items are easily accessible, properly labeled, and logically arranged based on factors such as demand, storage requirements, and product characteristics. Well-managed put-away activities contribute to streamlined order fulfillment and reduced picking time. Effective storage management involves maximizing space utilization, implementing appropriate storage systems for example (racking, shelving), and establishing inventory control mechanisms for example (FIFO, LIFO). Efficient storage practices contribute to optimized inventory levels, minimized stockouts, and improved order picking efficiency (Chan and Qi, 2003). Order Picking: Order picking is a critical activity in the physical distribution process, involving selecting and assembling items for customer orders. Efficient order picking strategies, such as zone picking or batch picking, can significantly impact the speed and accuracy of order fulfillment. Utilizing appropriate technology, such as barcode scanners or pick-to-light systems, can further enhance productivity.

Effective warehouse operations have become increasingly important due to factors such as globalization, e-commerce growth, and supply chain complexity (Gunasekaran *et al.*, 2008). Developed countries often employ advanced technologies, automated systems, and sophisticated warehouse management software to optimize their warehouse operations. This includes utilizing robotics, artificial intelligence, and data analytics to improve efficiency, accuracy, and responsiveness. Additionally, sustainable and eco-friendly practices are gaining importance worldwide. Warehouses in developed countries are adopting environmentally conscious measures such as energy-efficient lighting, waste reduction, and green packaging solutions to minimize their ecological footprint (Dekker *et al.*, 2012).

The history of receiving activity as a warehouse operations activity in the US can be traced back to the early days of industrialization when goods were received manually, and inventory records were kept using paper-based

systems. Over time, technological advancements and the implementation of barcode scanning and electronic data interchange (EDI) have streamlined the receiving process, enabling faster and more accurate verification of incoming shipments. In the US, the evolution of put-away activities coincided with the development of warehousing systems (Wikner *et al* 1991). Traditional methods involved manually assigning storage locations, but with the advent of automated storage and retrieval systems (AS/RS) and warehouse management systems (WMS), put-away processes have become more efficient and precise. These technologies allow for real-time tracking of inventory and optimized storage allocation based on factors like product characteristics and demand patterns (Bandyopadhyay & Sen 2011). Storage Activity: The history of storage activities in the US includes the transition from manual stacking and storing goods to the implementation of various storage systems, such as pallet racking, mezzanine floors, and shelving. In recent years, the US has seen an increasing adoption of automated storage solutions, including automated guided vehicles (AGVs) and robotic systems, to improve storage density and operational efficiency.

The UK has followed a similar trajectory to the US regarding receiving activities (Berquier *et al.,* 2013). Manual receiving processes have gradually been replaced by electronic systems, RFID technology, and advanced software solutions. These innovations have enhanced accuracy, accelerated the verification process, and facilitated real-time inventory updates. In the UK, the development of put-away activities aligns with the growth of modern warehousing practices. With the implementation of advanced WMS and automated material handling equipment, the put-away process has become more streamlined. Automated systems help optimize storage space utilization, reduce human errors, and improve overall warehouse efficiency. Storage practices in the UK have evolved to address changing market needs and maximize warehouse space (Smith *et al.,* 2000). From traditional pallet racking systems to narrow-aisle and high-density storage solutions, the UK has embraced innovative storage technologies. The focus is on efficient space utilization, inventory rotation, and inventory visibility through technologies like RFID tagging and integrated inventory management systems (Lefebvre *et al.,* 2008). The UK has witnessed significant advancements in order picking methods. Alongside traditional manual picking, the adoption of technologies like pick-to-light, voice-directed picking, and mobile picking devices has gained momentum. These technologies optimize picking routes, provide real-time inventory updates, and contribute to increased picking accuracy and productivity.

Warehouse operations in Asia in the developing world have experienced unique developments influenced by the region's economic growth and diverse market characteristics (Porcino & Hirt, 2003). The history of warehouse activities in Asia is marked by a combination of traditional practices and rapid adoption of advanced technologies. While manual receiving processes were prevalent in the past, many Asian countries have embraced automated systems for receiving, including barcode scanning and RFID technology. With the growth of e-commerce and logistics sectors, Asian countries have been quick to adopt technology-driven receiving solutions to handle high volumes of incoming shipments.

Asian warehouses have increasingly implemented advanced WMS and automated storage systems to optimize put-away activities. This includes the use of AS/RS, robotic systems, and conveyor systems to expedite the movement and storage of goods. Asian countries like Japan and South Korea have been at the forefront of warehouse automation. Storage practices in Asia vary across countries. Traditional storage methods, such as block stacking and manual shelving, are still prevalent in some regions. However, several Asian countries have embraced advanced storage technologies, including high-rise automated storage systems, to maximize storage capacity and operational efficiency. In Asia, order picking methods have evolved to meet the demands of diverse markets and high order volumes (Sarkis, 2001). Manual picking remains common, especially in labor-intensive markets. However,

countries like China and Singapore have seen significant investments in automation technologies, such as robotic picking systems and AGVs, to improve order fulfillment speed and accuracy.

The warehousing of pharmaceutical products in Africa is a critical aspect of healthcare supply chain management. With the continent's diverse and challenging geographical landscape, ensuring the efficient storage and distribution of medical supplies is essential for providing adequate healthcare to the population. (Singh *et al*., 2016)

African countries often face unique challenges in warehousing pharmaceutical products, including inadequate infrastructure, limited access to technology, and varying regulatory frameworks. These factors contribute to difficulties in maintaining proper storage conditions, tracking inventory, and ensuring timely delivery of medications to healthcare facilities (Uthayakumar and Priyan, 2013).

Furthermore, the demand for pharmaceutical products in Africa continues to rise due to population growth, increased urbanization, and a higher prevalence of chronic diseases. This amplifies the importance of establishing robust and reliable warehousing systems to safeguard the integrity of medical supplies and facilitate their distribution to healthcare providers across the continent. (Babatunde *et al*., 2020)

Addressing the complexities of warehousing pharmaceutical products in Africa requires a comprehensive approach that integrates technology, infrastructure development, regulatory harmonization, and capacity building. By enhancing the efficiency and resilience of pharmaceutical warehouses, Africa can better meet the healthcare needs of its growing population and improve the overall delivery of essential medications. The geographical landscape of Africa presents a multitude of unique challenges when it comes to warehousing pharmaceutical products. From the arid deserts of the Sahara to the lush rainforests of the Congo, each region requires tailored solutions to ensure the safe storage and timely distribution of medical supplies. Inadequate infrastructure, often exacerbated by challenging terrains and remote locations, poses a significant hurdle to establishing efficient warehousing systems. (Babatunde *et al*., 2020)

Moreover, the diverse regulatory frameworks across African countries present a complex landscape for pharmaceutical storage and distribution. Harmonizing these regulations is crucial for ensuring that medical supplies meet consistent quality standards and are readily available across borders. This necessitates collaboration among governments, regulatory bodies, and industry stakeholders to streamline processes and facilitate the movement of pharmaceutical products. (O'Brien *et al*., 2021)

In addition to the physical and regulatory challenges, the technological landscape in many African countries also presents barriers to efficient warehousing. Limited access to advanced inventory tracking systems, temperature control mechanisms, and supply chain management technologies hinders the ability to monitor and maintain the quality of pharmaceutical products throughout the distribution process. (Mokheseng *et al*., 2017).

As the demand for pharmaceutical products continues to soar in Africa, driven by population growth and the increasing prevalence of chronic diseases, the need for robust warehousing systems becomes even more pressing. These systems must be equipped to handle larger volumes of medical supplies while maintaining the integrity of the products and ensuring equitable distribution to healthcare facilities, even in the most remote areas (Costa et al., 2015).

Additionally, addressing the technological barriers in warehousing is vital for the efficient management of pharmaceuticals. Investment in advanced inventory tracking systems, temperature control mechanisms, and supply

chain management technologies is essential to ensure the quality and safety of medical supplies throughout the distribution process. (Harper, n.d)

The growing demand for pharmaceutical products in Africa calls for the expansion and modernization of warehousing systems to handle larger volumes of medical supplies while maintaining product integrity. This requires a strategic focus on capacity building to enhance the skills and knowledge of the workforce involved in pharmaceutical warehousing and distribution. (Tran *et al*., 2021)

The warehousing of pharmaceutical products in Cameroon is a critical aspect of the healthcare system. It plays a vital role in ensuring that essential medications reach the population in a timely and efficient manner. Cameroon, like many other developing countries, faces challenges in maintaining the quality and accessibility of pharmaceutical products due to factors such as infrastructure limitations, regulatory issues, and logistical constraints. (Schäfermann *et al*., 2020)

The pharmaceutical supply chain in Cameroon is a complex web of manufacturers, wholesalers, distributors, and retailers, all of whom play a crucial role in the safe storage and distribution of medicines. However, the country grapples with issues such as inadequate storage facilities, inconsistent temperature control, and insufficient monitoring of inventory levels. These challenges can lead to the deterioration of pharmaceutical products, compromising their effectiveness and safety. (Singh *et al*., 2016)

Furthermore, the geographical and infrastructural complexities of Cameroon present additional hurdles for the warehousing of pharmaceutical products. Remote and hard-to-reach areas often face difficulties in receiving timely supplies, which can result in stockouts and shortages of essential medications. (Schäfermann *et al*., 2020).

Efforts to improve the warehousing of pharmaceutical products in Cameroon should focus on enhancing infrastructure, implementing robust quality control measures, and employing innovative technologies to monitor and track the movement of medicines. By addressing these challenges, Cameroon can better ensure the availability of high-quality pharmaceutical products across the country, ultimately improving the overall healthcare delivery system (Okereke, 2022).

The impact of effective warehouse operations on the physical distribution of pharmaceutical products in Bamenda is a crucial area of study that warrants a comprehensive examination. In order to gain a deeper understanding of this topic, it is important to delve into the specific challenges faced by pharmaceutical companies in effectively managing their warehouse operations, such as inventory management, storage conditions, and transportation logistics. Considering the broader industry trends and regulatory frameworks that impact warehouse operations and physical distribution in the pharmaceutical sector, this study will provide a solid foundation for proposing recommendations and potential solutions for optimizing warehouse operations of pharmaceutical distribution companies in Bamenda.

## 2. Study Area and Research Methods

### 2.1 Study Area

Bamenda, also known as Abakwa and Mankon Town1, is a city in northwestern Cameroon and is the capital of the Northwest Region1. It is located 366 km (227 mi) northwest of the Cameroonian capital, Yaoundé. It is located between latitudes 5°51’0’’ and 6°3’0’’ North of the Equator and longitudes 10°3’0’’ and 10°15’0’’ East of the Greenwich Meridian. The city has a population of about 2 million people.

The city serves as the administrative and commercial center of the region, hosting various government offices and businesses. It is known for its cool climate and scenic hilly location. The city is made up of 3 villages; Bamendakwe, Mankon, and Nkwen classified as Bamenda I, II, and III sub-divisions respectively as shown in figure 1. However, it is surrounded by other suburban areas and villages like Bambui, Akum, Bafut, Bali, Chombah, and Mbatu.

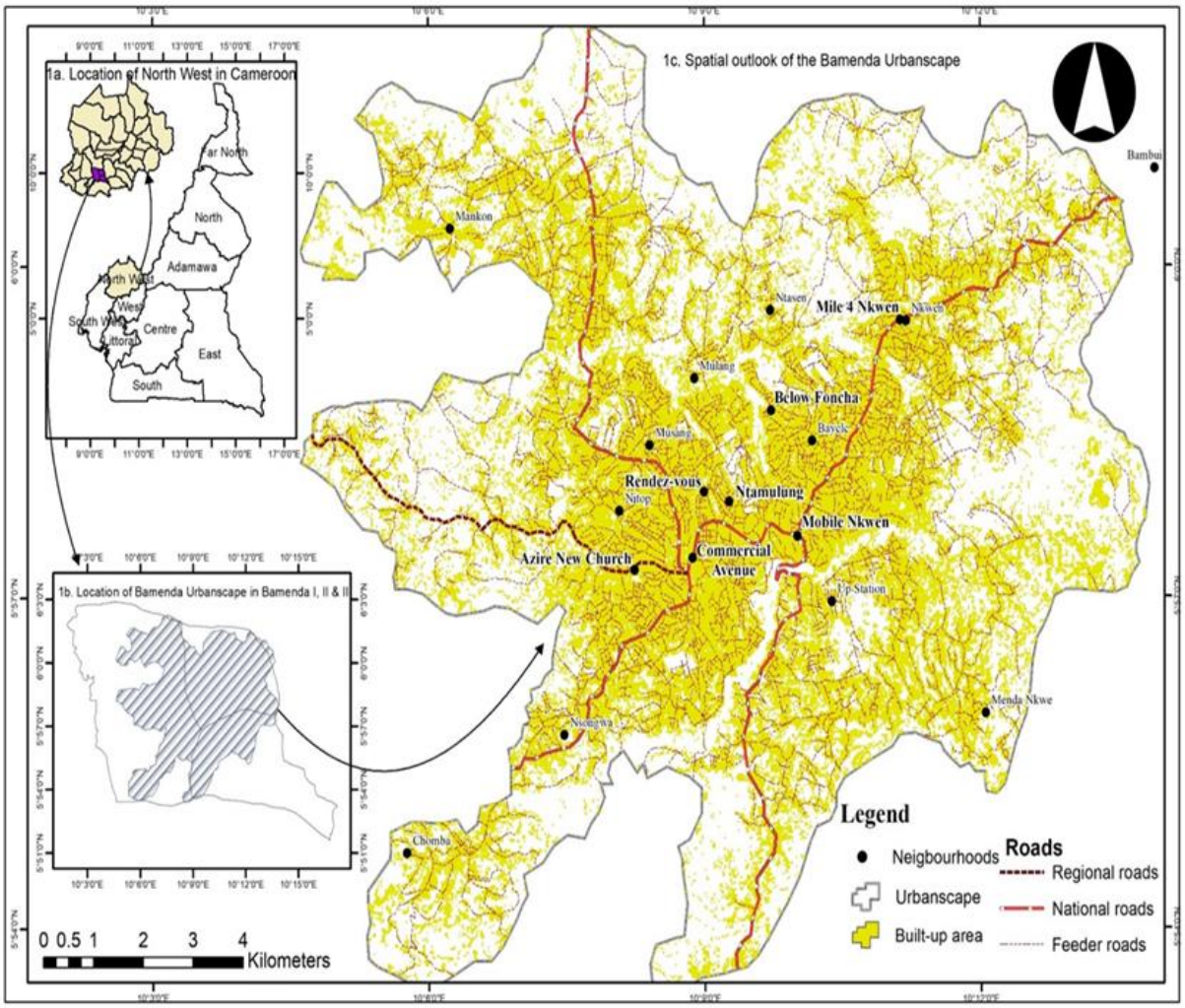


**Figure 1**. Location of Bamenda Urbanscape in Bamenda 1, 2 and 3 municipalities (Wani *et al*., 2020).

**2.2 Research Methods**

The research design for this study will employ a mixed research design, combining both qualitative and quantitative approaches. This mixed methods design will provide a comprehensive understanding of the research topic, allowing for the exploration of subjective experiences and perceptions (qualitative) as well as the measurement and analysis of numerical data (quantitative). The design is appropriate for this study because it allows for an in-depth exploration of the impact of effective warehouse operations practices on physical distribution of pharmaceutical products in Bamenda.

The instrument used for carrying out primary data collection in the study was questionnaires, a total of 110 questionnaires were administered to gather data on warehouse operations and physical distribution of pharmaceutical products from pharmaceutical stores in Bamenda. These questionnaires were administered to

employees in the departments relevant such as logistics, warehouse operations, supply chain, quality control, and physical distribution.

The questionnaires were administered directly to the employees at their duty posts. A structured questionnaire was prepared for the participants for data collection. The questionnaires were divided into sections. A set of predetermined questions that focused on the specific objectives of the study, such as the effect of receiving activity, put-away activity, storage activity, and order picking on physical distribution. The questions were answered based on a five-point likert scale ranging from Disagree (D), Strongly Disagree (SD), neutral (N), Agree (A), and Strongly Agree (SA). The duration for administering the questionnaires was one week.

The secondary sources of data for this study were obtained from existing literature, reports, and relevant publications related to warehouse operations, physical distribution, and supply chain management. These secondary sources served as valuable references and provided additional insights and context to support the research objectives and findings. The following are examples of secondary sources of data that were used:

Academic Journals and Research Papers: Peer-reviewed journals and research papers in the fields of logistics, supply chain management, and operations management were consulted to gather information on best practices, theories, and previous studies related to warehouse operations and physical distribution. These sources provided theoretical frameworks, empirical findings, and relevant case studies that helped to contextualize and enrich the study.

Books and Textbooks: Books and textbooks on logistics, warehouse management, and supply chain operations were reviewed to gain a comprehensive understanding of the subject matter. These sources provided theoretical foundations, conceptual frameworks, and practical insights into various aspects of warehouse operations and physical distribution.

Industry Reports and White Papers: Reports and white papers published by industry associations, logistics companies, and consulting firms were examined to gain insights into current trends, challenges, and innovative practices in warehouse operations and physical distribution. These reports often present industry-specific data, benchmarks, and case studies that helped to provide real-world perspectives.

Government Publications and Statistical Data: Government publications, such as trade and economic reports, provided macroeconomic context and data related to the logistics and supply chain landscape in Cameroon. Statistical data on trade flows, transportation infrastructure, and industry performance were utilized to support the analysis of the local market and its implications for warehouse operations and physical distribution.

The collected data was edited as this involved sorting of the collected information in order to get information that is relevant to the study. Data was then entered into the computer and analyzed by the use of Statistical Package for Social Scientists (SPSS) program that was used to develop frequency tables and graphs. Qualitative data was analyzed by developing themes (headings) or sub themes, which were derived from the study objectives. Both quantitative and qualitative techniques were used during data analysis. Inferential statistics, such as regression analysis, was used to examine relationships between variables and test hypotheses.

## 3 Results

### 3.1 The impact of receiving activities on the physical distribution processes of pharmaceutical distribution companies in Bamenda

The Table 1 below provides a summarized interpretation of the responses to each question regarding warehouse operations of pharmaceutical distribution companies in Bamenda (PDC) In regards to the presence of a Standard Operating Procedure (SOP) for receiving medicines, the majority of participants (46.4%) agreed that (PDC) has an SOP in place. Additionally, a significant proportion (33.6%) strongly agreed with this statement, indicating a high level of agreement among the participants.

Regarding the appropriate inspection of goods at the receiving stage, a substantial number of participants (46.4%) agreed that warehouse workers at (PDC) most of the time perform appropriate inspections. A considerable percentage (33.6%) also strongly agreed with this statement, further highlighting a positive sentiment. In terms of utilizing a reasonable warehouse space during goods receptions, a notable majority (45.5%) agreed that (PDC)'s warehouse workers most of the time utilize a reasonable warehouse space. Moreover, a significant portion (39.1%) strongly agreed, indicating a strong consensus on this aspect.

Regarding the confirmation of medicines matching original orders, a considerable percentage (29.1%) agreed that most of the time, warehouse workers at (PDC) confirm that all goods arrived are perfectly matched with the original orders. Furthermore, a substantial proportion (49.1%) strongly agreed, indicating a high level of confidence in this area. Lastly, when it comes to the timely inspection of received medicines, a noteworthy proportion of participants (24.5%) strongly disagreed that (PDC) warehouse personnel inspect received materials on a reasonable time. Furthermore, a considerable number (18.2%) disagreed, indicating areas for improvement in this aspect.

**Table 1: The impact of receiving activities on the physical distribution processes of pharmaceutical companies in Bamenda**

| S/N | Impact of receiving activity on physical distribution | SD | % | D | % | N | % | A | % | SA | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Availability of Standard Operating Procedure (SOP) for receiving of Medicines. | 16 | 15 | - | - | 6 | 5.5 | 51 | 46 | 37 | 34 |
| 2 | Most of the time, our warehouse workers perform appropriate inspections of products at receiving stage. | - | - | 3 | 2.7 | 12 | 11 | 51 | 46 | 37 | 34 |
| 3 | Most of the time, our warehouse workers utilize a reasonable warehouse space during receptions of products. | - | - | 4 | 3.6 | 3 | 2.7 | 50 | 46 | 43 | 39 |
| 4 | Most of the time, our warehouse workers confirm all the products arrived are perfectly matched with what originally ordered. | - | - | 2 | 1.8 | 12 | 11 | 32 | 29 | 54 | 49 |
| 5 | (PDC) warehouse personnel inspect received products on the reasonable time. | 29 | 26 | 20 | 18 | 17 | 16 | 17 | 16 | 27 | 25 |

A noteworthy 24.5% of participants strongly disagreed, and 18.2% disagreed regarding the timely inspection of received materials. This points to a significant concern that could impact warehouse efficiency. The identified delays could be stemming from various factors, including:

Resource Shortages: Insufficient personnel may lead to backlogs in the inspection process, Protocol Ambiguities: A lack of clear inspection protocols could cause inconsistency in how inspections are conducted, Logistical Challenges: Difficulties in managing the flow of incoming goods could hinder timely inspections.

Participants dissatisfaction could also suggest possible inaccuracies during the inspection process, leading to concerns about the quality of the checks being conducted. This emphasizes the need for thorough training and clear guidelines to ensure that inspections are both timely and accurate.

The findings illustrate that while (PDC)'S demonstrates strong practices through established SOPs, effective inspections, and good space utilization, there remain critical areas requiring attention, particularly regarding the timeliness of inspections. Addressing these challenges will be vital for enhancing overall operational performance and ensuring customer satisfaction. Implementing strategies such as increasing workforce training, optimizing inspection protocols, and improving resource allocation could significantly improve the efficiency of warehouse operations at (PDC)'S.

### 3.2 The impact of storage activities on the physical distribution of pharmaceutical products in Bamenda

This section presents the responses of the participants in respect to the effect of storage activity on physical distribution. The result of storage activity on physical distribution is presented in the table 2.

**Table 2: The impact of storage activities on the physical distribution of pharmaceutical products in Bamenda**

| S/N | Impact of storage activity on physical distribution | SD | % | D | % | N | % | A | % | SA | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Most of the time, our warehouse team are appropriately using available storage area for storing goods. | 31 | 28 | 17 | 15.5 | 21 | 19.1 | 15 | 13.6 | 26 | 23.6 |
| 2 | Most of the time, our warehouse team are effective in minimizing total goods damage that are stored in the warehouse. | 6 | 6 | 53 | 48.2 | 8 | 7.3 | 19 | 17.3 | 24 | 21.8 |
| 3 | In our warehouse, there is enough space between goods storage and walking way. | 8 | 7 | 16 | 14.5 | 14 | 12.7 | 49 | 44.5 | 23 | 20.9 |
| 4 | Most of the time, incoming goods are stored in their identified storage locations. | 5 | 5 | 11 | 10 | 11 | 10 | 52 | 47.3 | 31 | 28.2 |
| 5 | (PDC)'S warehouse personnel utilize reasonable warehouse spaces for goods handling. | 2 | 2 | 10 | 9.1 | 17 | 15.5 | 53 | 48.2 | 28 | 25.5 |

The Table 2 presents a summarized interpretation of the responses to each question regarding various aspects of warehouse operations in (PDC). Regarding the appropriate utilization of available storage area by the warehouse team, a significant portion (28.2%) strongly disagreed, expressing concerns about the team's effectiveness in this aspect. Additionally, 15.5% disagreed with this statement. However, there is a notable proportion (23.6%) who strongly agreed, suggesting that some participants believe the team is appropriately using the available storage area.

In terms of minimizing total goods damage in the warehouse, a significant number of participants (48.2%) disagreed with the statement, indicating that they perceive the warehouse team to be ineffective in minimizing goods damage. On the other hand, 17.3% agreed and 21.8% strongly agreed, suggesting that a considerable portion of participants believe that the team is effective in this regard. Regarding the presence of enough space between goods storage and walking areas, a small percentage (7.3%) strongly disagreed, suggesting that some participants find the space

inadequate. Additionally, 14.5% disagreed with this notion. However, a significant number of participants (44.5%) agreed that there is enough space, with an additional 20.9% strongly agreeing. These results indicate a relatively positive perception overall regarding the availability of space in the warehouse.

When it comes to the storage of incoming goods in their identified locations, a small proportion (4.5%) strongly disagreed, suggesting that some participants believe there are issues with storing goods in their designated locations. However, a majority of participants (47.3%) agreed that incoming goods are stored correctly, and 28.2% strongly agreed, indicating a positive perception overall. Regarding the utilization of reasonable warehouse spaces for goods handling by (PDC) warehouse personnel, there is a small percentage (1.8%) who strongly disagreed, suggesting that some participants find the utilization inadequate. However, the majority of participants (48.2%) agreed that reasonable warehouse spaces are utilized, with an additional 25.5% strongly agreeing.

### 3.3 Effects of order picking on Physical distribution of pharmaceutical products in Bamenda

This section presents the responses of the participants in respect to the effect of order picking on physical distribution. The result of receiving activity on physical distribution is presented in the table 3

**Table 3: The effect of order picking on Physical distribution of pharmaceutical products in Bamenda**

| S/N | Effects of order picking on Physical distribution | SD | % | D | % | N | % | A | % | SA | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | (PDC) warehouse personnel are skillful in performing order picking process. | 12 | 11 | 10 | 9.1 | 62 | 56 | 26 | 23.6 | - | - |
| 2 | Most of the time, our warehouse workers are performing order picking process errors free. | - | - | 11 | 10 | 10 | 9.1 | 26 | 23.6 | 54 | 49.1 |
| 3 | Our warehouse design/layout is convenient for an easy order picking process. | - | - | 10 | 9.1 | 13 | 12 | 19 | 17.3 | 65 | 59.1 |
| 4 | (PDC) inventory management system facilitates the order picking process. | - | - | 10 | 9.1 | 9 | 8.2 | 35 | 31.8 | 46 | 41.8 |
| 5 | (PDC) has adequate shelves for the goods in the warehouse to facilitate order picking process. | 4 | 3.6 | 3 | 2.7 | 10 | 9.1 | 50 | 45.5 | 43 | 39.1 |

The Table 3 presents the results of a survey conducted to assess various aspects of the order picking process in (PDC)'s warehouses.

Regarding the skill level of (PDC) warehouse personnel in performing the order picking process, 56.4% of the participants agreed that the personnel demonstrate the necessary expertise. Furthermore, 23.6% strongly agreed, indicating a high level of confidence in the skillfulness of the warehouse personnel. However, 10.9% expressed disagreement or strong disagreement, suggesting that there may be some concerns about the proficiency of a portion of the warehouse workforce. When it comes to the frequency of errors during the order picking process, 49.1% of the participants strongly agreed that most of the time, the warehouse workers perform the process error-free. An additional 23.6% agreed, indicating a widespread belief in the workers' ability to carry out error-free order picking. However, 10.0% disagreed and 9.1% were undecided, implying that there may be instances where errors occur or uncertainty about the overall error rate.

In terms of the convenience of the warehouse design/layout for order picking, the majority of participants (65%) strongly agreed that it is well-suited for an easy order picking process. Additionally, 17.3% agreed, indicating a positive perception of the design/layout's convenience. However, 2.7% strongly disagreed, 9.1% disagreed, and 11.8% were undecided, suggesting that a small portion of participants were dissatisfied with the layout or uncertain about its convenience. Regarding the role of (PDC)'s inventory management system in facilitating the order picking process, 41.8% of participants strongly agreed that the system is beneficial. Additionally, 31.8% agreed, suggesting a widespread believed in the system's ability to facilitate order picking. However, 9.1% disagreed, 8.2% were undecided, and 9.1% strongly disagreed, indicating that there are participants who do not perceive the system as effective or have uncertainties regarding its contribution to the process.

In terms of the availability of shelves for facilitating the order picking process, the majority of participants (39.1%) strongly agreed that (PDC) has adequate shelves. Furthermore, 45.5% agreed, indicating a positive perception of shelf availability. However, 2.7% strongly disagreed, 3.6% disagreed, and 9.1% were undecided, suggesting that a small proportion of participants were dissatisfied with the shelf situation or uncertain about their adequacy.

Based on the observations, while some participants perceive positive aspects of (PDC)'s warehouse operations, such as correct storage practices and availability of reasonable space, there are notable areas of concern, including space utilization, goods damage prevention, and goods placement accuracy.

### 3.4 Physical Distribution of pharmaceutical products in Bamenda

This section presents the responses of the participants in respect to Physical distribution which is to examine the physical distribution activities of (PDC). The result of physical distribution is presented in the table 4

**Table 4: Physical Distribution of (PDC).**

| S/N | Questions | SD | % | D | % | N | % | A | % | SA | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Receiving Activity has a significant positive effect on the performance of (PDC). | 2 | 1.8 | 12 | 11 | 10 | 9.1 | 32 | 29.1 | 54 | 49.1 |
| 2 | Put-way Activity has a significant positive effect on the performance of (PDC). | 29 | 26 | 20 | 18 | 17 | 16 | 17 | 15.5 | 27 | 24.5 |
| 3 | Storage Activity has a significant positive effect on the performance of (PDC). | 36 | 33 | 15 | 14 | 14 | 13 | 17 | 15.5 | 28 | 25.5 |
| 4 | Order Picking has a significant positive effect on the performance of (PDC). | 9 | 8.2 | 8 | 7.3 | 17 | 16 | 51 | 46.4 | 25 | 22.7 |
| 5 | Shipping Activity has a significant positive effect on the performance of (PDC). | 2 | 1.8 | 12 | 11 | 10 | 9.1 | 32 | 29.1 | 54 | 49.1 |

According to the participant’s, receiving activity has a significant positive effect on the performance of (PDC). A substantial 49.1% strongly agreed that this activity positively contributes to (PDC)'s performance, indicating a strong belief in its importance. Furthermore, 29.1% agreed, reflecting a notable consensus among participants regarding the positive impact of receiving activity. However, there were some dissenting voices, with 10.9% disagreeing and 9.1% remaining undecided about its significance.

Regarding put-way activity, a significant portion of participants, 24.5%, strongly agreed that put-way activity has a positive effect on (PDC)'s performance, indicating a belief in its importance. However, 44.5% disagreed or strongly disagreed, expressing skepticism or a lack of belief in the positive impact of put-way activity. Only 15.5% agreed, and 15.5% remained undecided, revealing a notable level of uncertainty among participants. The impact of storage activity on (PDC)'s performance was met with mixed responses as well. While 25.5% strongly agreed that storage activity has a positive effect, indicating a notable belief in its significance, a considerable proportion (46.4%) disagreed or strongly disagreed. This disparity suggests differing views among participants regarding the contribution of storage activity to (PDC)'s performance. Additionally, 15.5% agreed, and 12.7% remained undecided, highlighting a certain level of uncertainty or lack of consensus.

Regarding order picking, 46.4% of participants agreed that it has a significant positive effect on (PDC)'s performance. A further 22.7% strongly agreed, signifying a substantial belief in its impact. However, 7.3% disagreed, expressing a contrary opinion, and 15.5% were undecided, indicating a degree of uncertainty or lack of consensus about the effect of order picking on performance. Finally, participants indicated that shipping activity has a significant positive effect on (PDC)'s performance. A considerable 49.1% strongly agreed with this statement, underscoring their conviction about the positive impact of shipping activity. Another 29.1% agreed, further reinforcing the belief in its significance. However, 10.9% disagreed, and 1.8% strongly disagreed, suggesting a minority with differing opinions. Additionally, 9.1% were undecided, reflecting some uncertainty about the impact of shipping activity on performance.

Overall, the observations suggest that while there is a general consensus on the positive impact of receiving activities on (PDC)'s performance, there are varying opinions and uncertainty regarding the importance of put-away, storage, and order picking activities. These differing perspectives may indicate potential areas for improvement or further exploration in (PDC)'s physical distribution strategies to enhance overall performance and efficiency.

**4. Discussion of Results**

The results of our study indicate that receiving activity has a positive and significant effect on physical distribution. This finding is consistent with the study by Huang and Wong (2016), which found that receiving activity significantly impacted delivery reliability in (PDC)'s. The effective management of the receiving process ensures that goods are received in a timely and accurate manner, which contributes to improved physical distribution performance. The results suggests that for every unit increase in receiving activity, there is a corresponding increase in physical distribution.

The results suggest a minimal and non-significant relationship between storage activity and physical distribution. It is possible that other factors, such as inventory management and order picking, play a more influential role in determining physical distribution performance.

Our study confirms that order picking has a positive and significant effect on physical distribution. This finding is consistent with the study by Njamen (2021), which found that effective order picking practices significantly contributed to physical distribution performance in a pharmaceutical company. The results indicates that an increase in order picking activity is associated with an improvement in physical distribution. Efficient order picking processes, such as optimized routing and accurate picking, reduce order cycle time and enhance delivery reliability.

In conclusion, this study aimed to examine the factors influencing the physical distribution performance of pharmaceutical products in Bamenda. Through the analysis of empirical data and the review of relevant literature, several key findings have emerged.

Firstly, it was found that the receiving activity, put-away activity activity, and order picking have a significant positive effect on the physical distribution of pharmaceutical products in Bamenda. These activities play crucial roles in ensuring efficient and effective movement of goods within the warehouse and ultimately contribute to improved physical distribution performance.

Secondly, the study highlights the importance of effective warehouse operations practices, such as inventory management, order picking accuracy, warehouse layout design, and the utilization of appropriate technologies. These practices not only enhance operational efficiency but also have a direct impact on physical distribution performance.

Moreover, the study underscores the significance of strategic decision-making in warehouse design and layout, inventory management, and order processing. Attention to factors such as space utilization, storage location assignment, and process optimization can lead to improved physical distribution outcomes.

Furthermore, the findings highlight the need for continuous improvement and adaptation to changing market dynamics. The integration of sustainable practices, technological innovations, and the consideration of cross-cultural factors can further enhance physical distribution performance.

**5. Recommendations to pharmaceutical distribution companies in Bamenda**

**a. Enhance Receiving Processes:** Pharmaceutical companies in Bamenda should focus on improving the efficiency and accuracy of their receiving processes. This can be achieved by providing training to warehouse personnel, implementing standard operating procedures (SOPs), and utilizing technology solutions such as barcode scanning or RFID systems for better tracking and verification of received goods.

**b. Optimize Put-away Operations:** Pharmaceutical distribution companies in Bamenda should prioritize optimizing put-away operations to ensure efficient and organized storage of goods. This can be accomplished by implementing effective storage policies, utilizing warehouse management systems (WMS) for automated put-away processes, and regularly reviewing and optimizing storage utilization to maximize space and accessibility.

**c. Streamline Order Picking:** Pharmaceutical distribution companies in Bamenda should invest in technologies and strategies to streamline their order picking processes. This can include implementing pick-to-light or voice-guided picking systems, optimizing order picking routes, and ensuring accurate inventory information to minimize errors and improve picking efficiency.

**d. Continuous Improvement:** It is recommended that pharmaceutical distribution companies in Bamenda should continuously monitor and evaluate their warehouse operations through regular performance assessments, benchmarking against industry best practices, and seeking feedback from customers and employees. This will enable them to identify areas for improvement and implement necessary changes to enhance physical distribution performance.

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