



THE EFFECT OF INVENTORY MANAGEMENT PRACTICES ON THE PERFORMANCE OF HUMANITARIAN ORGANIZATIONS IN THE BAMENDA MUNICIPALITIES, CAMEROON

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Abstract

This study examines the effect of inventory management practices on the performance of humanitarian organisations in the Bamenda Municipality, Cameroon. Amidst the volatile socio-political environment of the Anglophone Crisis, effective inventory control has transitioned from a routine task to a strategic necessity for aid delivery. Using a cross-sectional descriptive survey of 85 active humanitarian organisations, the study evaluates practices including inventory optimisation, pre-positioning, demand forecasting, and Just-in-Time (JIT). Data were analysed using Ordinary Least Squares (OLS) regression. The findings reveal that inventory optimisation ($\beta=0.365$, $p<0.05$) and pre-positioning of supplies ($\beta=0.453$, $p<0.05$) are the strongest positive

predictors of performance. Conversely, demand forecasting and JIT were statistically insignificant due to extreme instability and a 72.9% reliance on manual tracking systems. The study recommends that organisations prioritising internal capacity building and strategic stockpiling will best mitigate supply chain disruptions in conflict zones.

Keywords: Inventory management, Performance, Demand forecasting, Bamenda Municipality, Humanitarian Organization, Demand Forecasting

INTRODUCTION

The global humanitarian field is becoming increasingly challenging, characterized by the overlapping complexities of climate change, rising urban populations, and persistent political unrest (B. Nielsen et al., 2013). Since the major systemic reforms in 2005 following the 2004 Southeast Asia tsunami, humanitarian organisations have had to adapt to a growing number of emergencies, including armed conflicts and disease outbreaks, forcing them to take on new roles to meet the shifting demands of affected populations (Patrick Saez et al., 2021; A. Kamradt-Scott et al., 2015). In this volatile landscape, inventory management has evolved from being viewed as a non-strategic activity into a vital component for achieving operational success and organisational performance (Jayanthi Ranjan et al., 2012; J.C.Munyaka et al., 2022). Inventory management is defined as a methodical approach to procuring, storing, and disposing of inventory including both raw materials and finished products to ensure continuous availability while avoiding the risks of overstocking or stockouts (Rudy Santosa Sudirga et al., 2021). For humanitarian agencies, maintaining optimal inventory levels is critical; while excessive stock leads to higher storage costs and risks of damage or expiration, suboptimal levels impede response times during emergencies (Jayanthi Ranjan et al., 2012; Maurya et al., (2026)). Evidence suggests that modern inventory practices, such as IoT-based systems, can improve relief distribution efficiency by nearly 45%, significantly reducing shipping times for life-saving supplies like food and medication (Muhammad Dachyar et al., 2019; Putri Dwi Annisa et al., 2024). Consequently, there is a positive correlation between robust inventory management practices and the logistics performance of humanitarian organisations (E.R.Wasike et al.(2020)).

In the context of Bamenda, located in Cameroon's Northwest Region, the environment for humanitarian work is particularly complex due to the ongoing Anglophone Crisis (P. Acha-Anyi et al., 2024). This crisis has resulted in mass internal displacement, human rights violations, and severe economic disruption, placing extreme pressure on healthcare, education, and basic infrastructure (Yauba Saidu et al., 2021; Awu, I. O., & Hui, X. (2025)). As displaced populations flee to Bamenda's urban centres, the demand for humanitarian assistance in areas such as food

security and health has escalated, making efficient supply chain logistics a necessity for survival (Eugene Muambeh Muntoh et al., 2020; Kiye, M., & Joel, A. (2025)).

Humanitarian needs in Cameroon have dramatically increased due to rising levels of violence and insecurity, with the Anglophone Crisis since 2016 resulting in devastating basic need deficiencies and widespread food insecurity (Serge Silatsa Nanda et al., 2021; Acha-anyi et al., 2024). Organisations operating in the Bamenda municipalities are burdened by a heavy reliance on international funding, poor inter-organisational coordination, and a significant lack of internal capacity (Eugene Muambeh Muntoh et al., 2020). These organisations face severe geographical and accessibility barriers, where damaged infrastructure and security threats lead to delayed deliveries, stock-out conditions, and poor tracking systems that limit the ability to respond to urgent needs (Mukum Cenotar Engwari et al., 2021; Ijeoma Kelechi Charles et al., 2026; OCHA CAMEROON, 2025). Furthermore, a lack of collaboration leads to fragmentation, duplication of efforts, and inconsistent aid delivery, while a chronic shortage of trained logistics professionals results in manual supply chain processes and distribution bottlenecks (S.Moki et al. (2024); P.C.Fiorini et al. (2021)). Coupled with chronic under-funding and rigid regulatory restrictions, these logistical impediments compromise the reliability of the supply chain in Bamenda, highlighting an urgent need to evaluate how inventory management practices can be optimized to improve organisational performance (Marianne Jahre et al., 2008; M.Pöysti et al. (2019)).

In trying to solve these problems, it raises the question if there is a statistically significant effect of inventory management practices on the performance of humanitarian organisations in the Bamenda Municipalities? To answer this question our objective of this study is evaluate the effect of inventory management practices on the performance of humanitarian organisations in the Bamenda Municipalities. We therefore have as;

H0: Inventory management practices have no statistical significant effect on the performance of humanitarian organizations in Bamenda Municipality.

H01: Inventory management practices have has a statistical significant effect on the performance of humanitarian organizations in Bamenda Municipality.

LITERATURE REVIEW

Inventory management in humanitarian organisations is a systematic control of stock levels, including cost accounting, stock level management, and timely replenishment to ensure that supply effectively meets demand during disaster response and relief operations. Effective management is essential to minimize waste, maximize resource utilization, and deliver aid quickly enough to save lives (Pettit & Beresford, 2009). Key practices serving as an operational framework include tracking inventory through technologies like RFID and barcodes to provide

real-time visibility (Young M. Lee & Feng Cheng, 2004), and conducting methodical inventory audits to verify accuracy and increase transparency (B. Jarah et al., 2022). Advanced electronic systems (INMS) automate tracking and reporting, allowing for improved response capabilities (Dubey et al., 2025), while inventory optimization balances costs against desired service levels to fulfill demand while minimizing excess (Charles et al., 2010). Furthermore, pre-positioning supplies at strategic locations decreases lead times (Heaslip, Sharif & Althonayan, 2012), and accurate demand forecasting based on past data ensures adequate replenishment (Jahre & Heigh, 2008). Other critical practices include maintaining distribution readiness to ensure aid arrives in good condition (Kovács & Spens, 2007) and employing Just-in-Time (JIT) methodologies to reduce holding costs and waste (Oloruntoba & Gray, 2006).

Performance measurement in these settings involves assessing effectiveness and efficiency through frameworks like Key Performance Indicators (KPIs), which focus on outputs such as lives saved and cost-efficiency (Beamon & Balcik, 2008). Vital KPIs for the Bamenda Municipality include inventory accuracy and availability, which eliminate stockouts and enhance responsiveness (B. Beamon & B. Balcik, 2008), and lead time for procurement, where shorter durations and reliable deliveries result in faster disaster response (Abidi et al., 2014). Cost efficiency remains a significant indicator, as monitoring storage and stockout costs allows resources to be redirected toward relief efforts (Anderson Nunes da Silva et al., 2024). Empirical studies across Africa highlight the practical impact of these measures; for instance, research in Ethiopia found that laboratory commodity availability was often limited by a lack of funding and trained staff (Boche et al., 2022), while studies in Kenya demonstrated that improvements in inventory, transport, and warehousing have a direct positive effect on organizational efficiency (Wasike E.R. & Juma D., 2020). Challenges such as bureaucratic procurement systems, identified in studies by Taye (2022), often lead to delayed contracts and increased costs, whereas the adoption of e-inventory systems and standardized procurement processes has been shown to significantly improve overall organizational effectiveness (Arasa & Achuora, 2020; Muhwezi et al., 2023). Ultimately, utilizing metrics like the inventory turnover ratio is especially crucial for managing perishable items and increasing emergency preparedness capacities (E.R. Wasike & D. Juma, 2020).

THEORIES

Resource-Based View (RBV)

The Resource-Based View (RBV) posits that an organisation's competitive position is determined by its successful deployment of unique, scarce, and valuable resources that are difficult for competitors to replicate (Madhani, 2010). For these resources to offer a sustainable

competitive advantage, they must meet the VRIN criteria, meaning they are valuable, rare, inimitable, and non-substitutable (Madhani, 2010). While the RBV suggests that firm-specific resources can lead to sustained advantages (Kraaijenbrink et al., 2010), it also clarifies that only strategically managed resources that create value and limit imitation lead to enhanced performance (Peteraf, 1993).

For humanitarian managers, this framework is essential for distinguishing between core resources that must remain internal and non-core functions—such as warehousing, logistics, or transportation—that can be outsourced to specialised entities (Cohen, 2016). By outsourcing these tasks, organisations can leverage external expertise, reduce internal resource burdens, and focus limited resources on mission-critical activities (Mweru & Maina, 2016). To sustain these performance gains, organisations must protect their proprietary core resources through organizational culture and managerial processes while managing external partnerships to prevent the erosion of unique competencies (Cohen, 2016; Madhani, 2010).

Transaction Cost Theory (TCT)

Transaction Cost Theory (TCT) examines why firms choose to either internalise activities or outsource them by analyzing the costs associated with economic exchanges, such as negotiations, monitoring, and contract enforcement (Williamson, 2008). Organizations aim to minimise both the external costs of market transactions and the internal "bureaucratic" costs of coordination (Williamson, 2008). According to TCT, firms will internalise activities if market exchange costs are higher than internal coordination costs; conversely, they will outsource when internal administrative costs exceed market transaction costs (Williamson, 2008).

Empirical research suggests that transaction costs increase whenever goods or services cross technological boundaries, introducing complexity into exchanges (Mooi, 2015). Environmental factors such as uncertainty, opportunism, and bounded rationality also raise the risks and costs of outsourcing, often leading firms to retain activities internally to avoid contracting-related expenses (Williamson, 2008). For humanitarian organisations operating in complex or unstable environments, TCT provides a tool to weigh the risks of third-party dependence against the costs of internal operations (Cohen, 2016). Ultimately, this analysis helps organisations determine operational efficiencies by balancing cost, risk, and strategic focus.

Agency Theory

Agency Theory is used to assess how outsourcing influences performance by examining relationships where a principal (the humanitarian organisation) delegates tasks to an agent (the service provider) (EL KOUIRI, 2023). These arrangements often encounter issues due to

information asymmetry, where the agent possesses information that is unavailable to the principal, potentially leading to decisions that do not align with the principal's goals (Linder & Foss, 2013; EL KOUIRI, 2023). For instance, if a provider does not disclose service difficulties, it can negatively impact the humanitarian organisation's overall responsiveness.

To mitigate these risks, the theory emphasizes the need for synchronised interests and robust monitoring systems (Heaslip & Kovács, 2019). Humanitarian organisations must clearly define expected outcomes and use contractual terms that encourage agents to act in the principal's best interest (Heaslip & Kovács, 2019). By establishing accountability and trust, organisations can improve performance while addressing the challenges of managing control and communication with external agents.

Research Gap

Inventory Management in Humanitarian Organizations refers to the efficient procurement, storage and distribution of essential goods as food, medicines and housing materials. Although there is an increasing number of studies related to inventory management in humanitarian contexts; however, most studies did not take into account the special problems that occur in a conflict zone like Bamenda (for example: insecurity, destruction of infrastructure, limited accessibility). Also, studies that analyze inventory management in "generic" disaster situations do not represent the same degree of complexity like in a conflict zone such as Bamenda.

METHODOLOGY

The study focuses on Bamenda, Cameroon, a region selected due to the ongoing socio-political crisis and population migration that has necessitated extensive humanitarian support. The researchers ensured the academic rigor of the study by performing reliability tests using Cronbach's Alpha and checking for heteroscedasticity via the Breusch-Pagan test. Throughout the process, the study strictly complied with all ethical requirements, specifically focusing on maintaining respondent anonymity. The research utilizes a predictive, cross-sectional descriptive survey design to identify patterns in inventory management and organizational performance. This design is considered appropriate for describing the current state of a phenomenon or examining relationships at a specific moment in time (Grimes & Schulz, 2002). Research design acts as an overall strategy to answer research questions through data collection and interpretation, specifying procedures to provide answers while maximizing the usefulness of information relative to cost (Asenahabi, 2019). Furthermore, cross-sectional studies are versatile and can be applied across numerous fields, including social sciences (Bornstein et al., 2013).

Model Inventory Management Practice and Performance

Inventory Management provides a suitable framework for assessing Performance as influenced by employee Inventory Management practices across various sectors of Humanitarian Organisations within the Bamenda municipality located in the Northwest Region of Cameroon. The present research has adapted and revised the Regression Model provided by Kristen Himelein et al. (2017) with respect to the needs of this study. Kristen Himelein et al. (2017) had previously defined Operational Performance as being a direct function of Vendor Managed Inventory (VMI), Demand Forecasting (DF), Just-In-Time (JIT), Error Term, and specified the following mathematical relationship for Performance and Inventory Management:

$$PEF = F(IO, DF, DD, JT, PP, YE) \quad (1)$$

In the above expression, PEF denotes Performance of a Humanitarian Organisation; IO, DF, DD, JIT and PP represent inventory optimisation, demand forecasting, distribution and delivery readiness, and pre-positioning of supplies, respectively; and YE represents the number of years that is the control variable. These five dimensions of inventory management were utilised in the present study in reference to Humanitarian Organisation. Also noteworthy is that these variables are index values to be created via Multi-Criteria Analysis (MCA). The inclusion of YE as the sole control variable in the model is also noted. The economic model derived from the functional form is represented as follows:

$$PERFi = \alpha_0 + \alpha_1 IO_i + \alpha_2 DFi + \alpha_3 DD_i + \alpha_4 JT_i + \alpha_5 PP_i + \alpha_6 YE + \varepsilon_i \quad (2)$$

The unit of observation "i" in the study represents each humanitarian organization. In econometric studies, "a" represents the slope coefficient which quantifies the actual relationship between the humanitarian organization's inventory management practices and its performance; and "ε" represents the random error.

Data Source and Collection Tools

The study relies on primary data, defined as information gathered for the first time specifically for the research (Driscoll, 2011). This data was collected through a detailed structured self-designed questionnaire administered to 85 staff members, often during their field activities. Primary data of this nature is typically collected via surveys or observations to address specific objectives (Mazhar, 2021). The choice of questionnaires as a tool was based on their cost-effectiveness and the fact that they ensure all respondents receive identical questions, making the data easier to analyze (Roopa & Rani, 2012). The questionnaire was structured into five sections covering demographics, the effects of inventory management, the effects of outsourcing, moderating effects, and performance challenges. It primarily employed closed-ended questions, which provide respondents with specific answer areas, though it also used open-ended questions

to allow for personalized responses (Geer, 1988; Singer & Couper, 2017). To ensure validity defined as how accurately the results reflect the phenomenon being studied (Goodwin, 2002) the researcher consulted with a supervisor specializing in inventory management and research methodology to assess content relevance.

Population, Sample Size, and Sampling Technique

The target population consisted of 109 registered and active humanitarian organizations in the Bamenda municipality (UN-OCHA, 2025). While the researcher intended to survey the entire population, the final sample size was 85 organizations because several had closed due to insecurity and funding issues (Mavodza et al., 2019; Fòs Feminista, 2021). Due to the small population and safety concerns, no traditional sampling technique was used; instead, the researcher conducted a practical census of all accessible organizations. This choice reflects the realities of the field, where security concerns often limit access to standard sampling procedures (Himelein et al., 2017).

Data Analysis Procedures

Quantitative data gathered from the field was cleaned and entered into Stata 14 and Microsoft SPSS software for processing. The researchers analyzed the data using Ordinary Least Squares (OLS) to establish relationships between variables. The final results of this analysis are presented through the use of percentages and probabilities to clearly illustrate the study's findings.

FINDINGS AND DISCUSSION

In order to present the findings and discussion of this study we start by presenting our demographic characteristics below in table 1 to illustrate the demographic characteristics of the respondent who were involved in the study. It shows the distribution of respondents based on sex, level of education, age, and professional position, providing a clear profile of the individuals who contributed data to the research.

Demographic Characteristics of Respondents

As illustrated in table 1, the respondents' demographics showed that there was a substantial number of male and female respondents who took part in the survey. Therefore, it can be seen that the gender representation of the two genders was almost equal since the percentage of male respondents was 48.2% whereas that of female respondents was slightly more, i.e., 51.8%. Consequently, the near equality of the two genders in the representation in the study helped reduce possible biases and provided adequate representation of both sexes.

Table 1: Demographic Characteristics

SN	Variables	Category	Frequency	Percentage
1	Sex	Male	41	48.2
		Female	44	51.8
		Total	85	100.0
	Level of Education	Primary Education	0	0
		Secondary Education	0	0
		Undergraduate	31	36.5
		Postgraduate	54	63.5
		Total	85	100.0
	Age	Less than 18	0	0
		18-27	21	24.7
		28-37	30	35.3
		38-47	32	37.6
		48-60	2	2.4
		Above 60	0	0
		Total	85	100.0
	Position	Inventory Manager	24	28.2
		Logistics Manager	33	38.8
		Procurement Officer	13	15.3
		Operations Manager	15	17.6
Total		85	100.0	

Moreover, it can also be observed from table 1 that all of the respondents had acquired tertiary education qualifications. It can therefore be concluded that the highest level of education achieved by the majority of the respondents (i.e., 63.5%) was at post graduate degree level. On the other hand, the remaining 36.5% of respondents held an undergraduate degree. Furthermore, the fact that none of the respondents had attained primary or secondary education indicates that humanitarian organizations in Bamenda have recruited high school graduates into managerially oriented positions based on their academic credentials. Such recruitment is critical because humanitarian organizations require employees to possess advanced skills and knowledge in order to effectively carry out various technical and analytical tasks associated with inventory control and outsourcing practices.

Furthermore, the age distribution data collected in table 1 show that most of the respondents were working aged adults, where 35.3% of respondents belonged to age groups ranging from 28-37 years old, while another 37.6% of respondents belonged to age groups

ranging from 38-47 years old. Similarly, 24.7% of respondents were found to belong to age groups ranging from 18-27 years old. Conversely, only 2.4% of respondents belonged to an age group of 48-60 years old. Additionally, none of the respondents were under 18 years or over 60 years old. Therefore, it can be inferred that the workforce composition of humanitarian organizations in Bamenda primarily consists of middle-aged and youthful employees who are sufficiently matured professionally to support the operational needs of humanitarian work.

Lastly, as indicated in table 1, the distribution among job types reveals that most of the respondents were logistics managers (i.e., 38.8%), followed by inventory managers (i.e., 28.2%), then operations managers (i.e., 17.6%), and finally procurement officers (i.e., 15.3%). Thus, it can be inferred that a large portion of the respondents hold jobs that are directly related to supply chain management and inventory control, and consequently they will likely provide valuable insights about how inventory management practices and outsourcing influence organizational performance. Overall, the demographic characterization of the sample used in this research provides evidence that the researchers utilized a valid, knowledgeable, and representative sample; hence enhancing confidence in the results produced by this study.

Humanitarian Organisation

The figure is a chart titled “Humanitarian Organisation.” It presents the distribution of respondents across different types of humanitarian organizations in the Bamenda Municipality, including international NGOs, government agencies, and local NGOs.

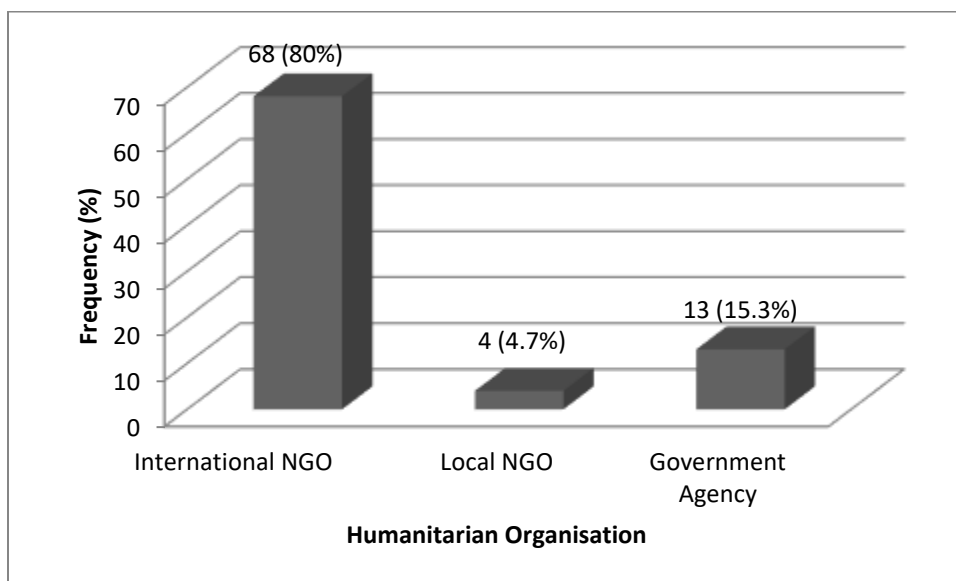


Figure 1: Humanitarian Organisation

The distribution of participants by type of humanitarian organisation is shown in Figure 1. It shows that 80 per cent (n = 68) of participants reported working with international NGO's; 15.3 per cent (n = 13) as a representative of a government agency and just 4.7 per cent (n = 4) represented local NGOs. These findings show the significant influence that international NGOs have on the provision of emergency aid and coordination of response efforts in the municipality and suggest that international NGOs are the most influential humanitarian actors operating in this area. Additionally, it suggests that the participation of both government agencies and local NGOs has been to some extent marginalised from participating fully in humanitarian responses and therefore will be significantly less involved than international NGOs.

Inventory Management Practices and Characteristics

Frequency organization conducts inventory audits

This figure is a chart titled “Frequency organization conducts inventory audits.” It presents how often humanitarian organizations carry out inventory audits, showing categories such as annual, bi-annual, quarterly, monthly, and never.

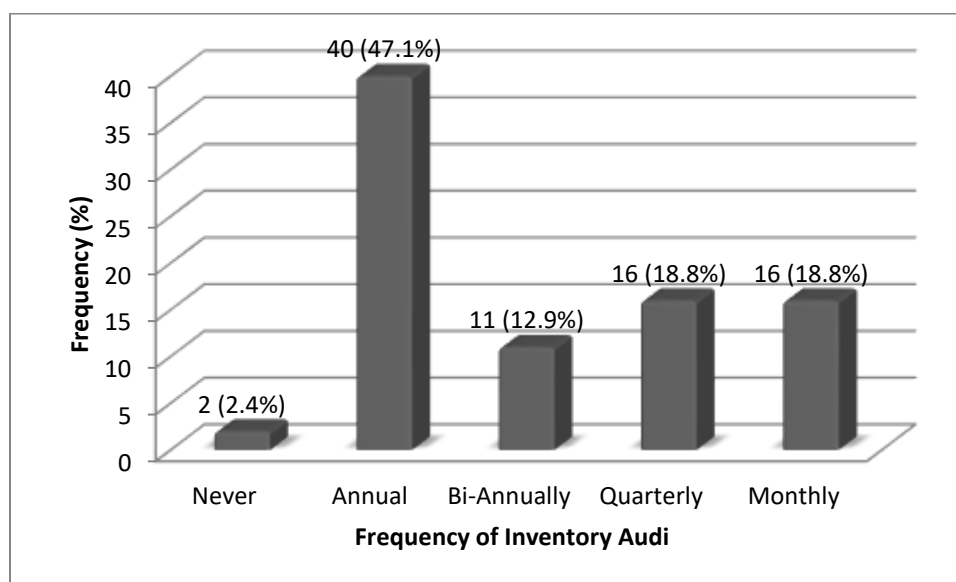


Figure 2: Frequency organization conducts inventory audits

Figure 2 illustrates the frequency with which humanitarian organisations in Bamenda conducted inventory audits. The findings revealed that nearly half of the organisations, representing 47.1 percent (40), carried out inventory audits annually. A smaller proportion, 12.9 percent (11), conducted audits on a bi-annual basis, while 18.8 percent (16) each carried out audits quarterly and monthly. Only 2.4 percent (2) of the organisations reported never conducting

inventory audits. These results suggested that although most organisations engaged in periodic auditing, the majority preferred annual reviews rather than more frequent checks. This practice implied that while organisations acknowledged the importance of inventory accountability, there was limited adoption of shorter audit cycles that could enhance efficiency, minimize discrepancies, and improve responsiveness in humanitarian operations. The relatively low rate of quarterly and monthly audits indicated that opportunities still existed for organisations to strengthen internal control mechanisms and promote real-time accuracy in inventory management.

Inventory Management Systems

This figure is a chart titled “Inventory Management Systems.” It presents the different types of inventory systems used by organizations, including manual systems, Just-in-Time, ERP systems, barcode systems, and cloud-based platforms.

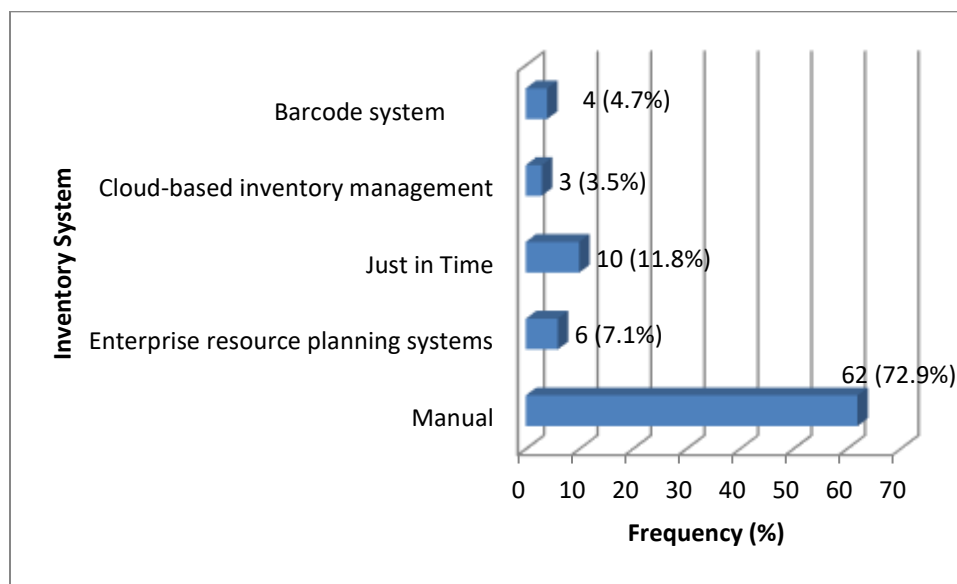


Figure 3: Inventory Management Systems

Figure 3 shows the different types of inventory management systems employed by humanitarian organisations in Bamenda. The results indicated that the majority of organisations, representing 72.9 percent (62), relied on manual systems for managing their inventory. Other forms of systems were used much less frequently. Specifically, 11.8 percent (10) of the organisations applied the Just-in-Time approach, 7.1 percent (6) used enterprise resource planning (ERP) systems, 4.7 percent (4) adopted barcode systems, while only 3.5 percent (3) employed cloud-based inventory management platforms.

These findings suggested that inventory management in humanitarian organisations was still largely traditional, with a heavy dependence on manual methods. While manual systems may be simple and cost-effective, they often limit efficiency, increase the likelihood of errors, and reduce the speed of decision-making compared to automated systems. The very low adoption of advanced technologies such as ERP, barcoding, and cloud-based solutions indicated that most organisations had not fully embraced modern digital tools that could improve visibility, accountability, and responsiveness in inventory control. The reliance on Just-in-Time by a small proportion of organisations highlighted some level of effort to optimize stock levels, but overall, the dominance of manual systems reflected a gap in technological advancement in humanitarian supply chain practices within the study area.

Stock outs occurrence in the organization

This figure is a chart titled “Stock outs occurrence in the organization.” It presents how frequently organizations experience stock outs, with categories such as never, rarely, sometimes, often, and always.

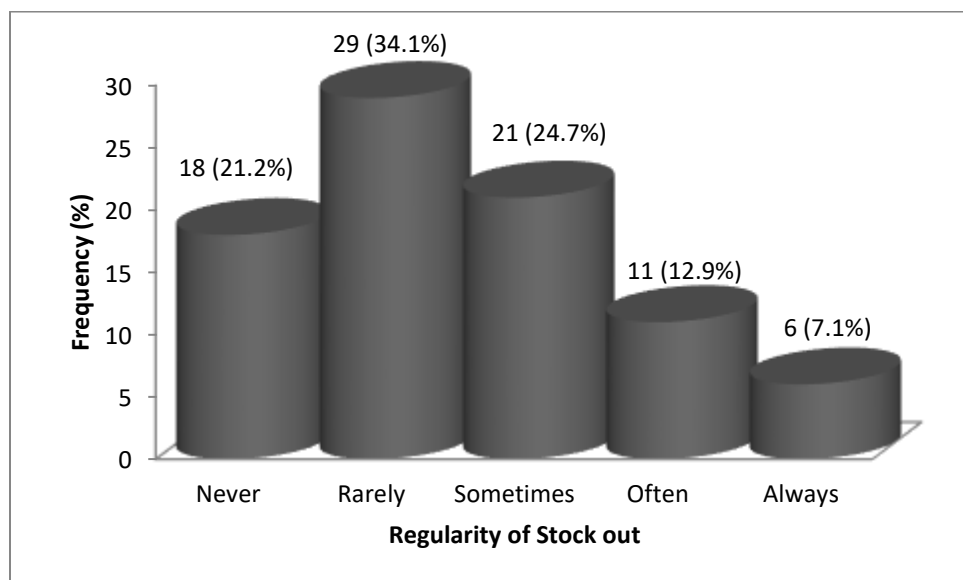


Figure 4: Stock outs occurrence in the organization

As can be seen, Figure 4 illustrates the regularity of stock outs experienced by humanitarian organisations in Bamenda. The results showed that 34.1 percent (29) of the organisations reported that stock outs occurred rarely, while 24.7 percent (21) indicated that stock outs sometimes occurred. A smaller proportion of respondents, 12.9 percent (11), stated that stock outs occurred often, whereas 7.1 percent (6) confirmed that stock outs always occurred in

their organisations. On the other hand, 21.2 percent (18) of the respondents reported that their organisations never experienced stock outs.

These findings suggested that although a few organisations managed to avoid stock outs entirely, the majority still faced challenges with maintaining consistent inventory availability. The fact that more than half of the organisations (56.5 percent) experienced stock outs at least “sometimes” highlighted weaknesses in inventory management and supply chain practices. Such interruptions could have significant implications for humanitarian performance, especially in emergency contexts where timely availability of supplies is critical. The predominance of the “rarely” category implied that stock outs were not a daily problem for most organisations but still occurred often enough to pose risks to effective aid delivery. Overall, the results pointed to the need for stronger forecasting, better stock control systems, and more reliable supply chain mechanisms to minimize stock out occurrences.

Management of excess inventory

This figure is a chart titled “Management of excess inventory.” It presents the strategies used by organizations to handle excess stock, including storage, donation, redistribution, disposal, and discounted sales.

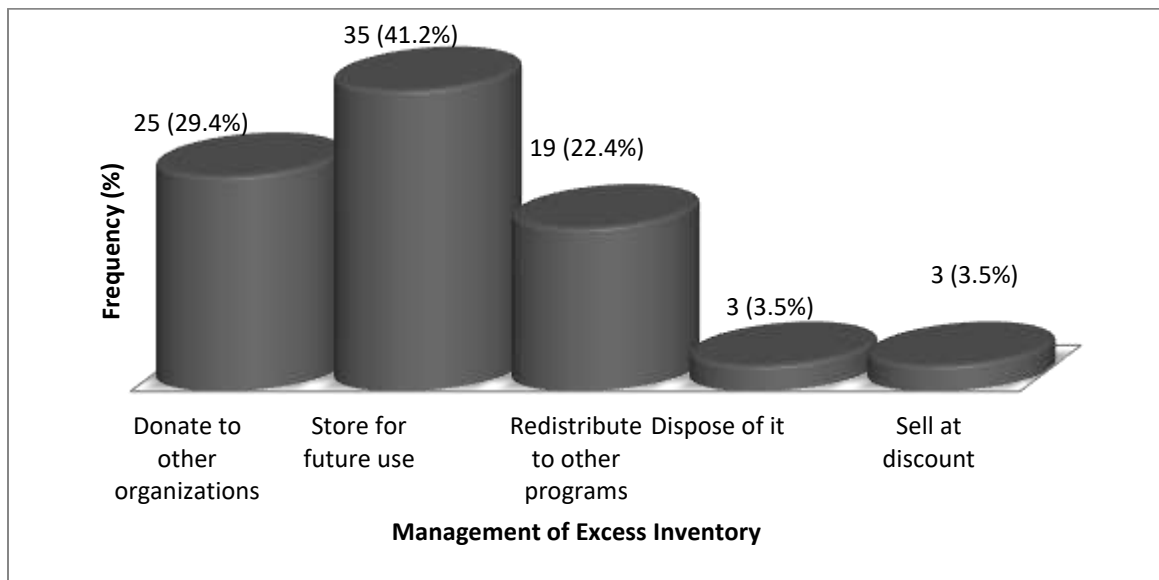


Figure 5: Management of excess inventory

Figure 5 illustrates the ways in which humanitarian organizations managed excess inventory in Bamenda. Of those surveyed, 41.2% (35) stated that they stored the excess materials for later use; this was the most common practice. In addition, nearly one-third (29.4%, 25) of the

participants stated that their organization donated its excess inventory to another organization; and 22.4% (19) redistributed excess materials to other programs within their operation. Other approaches such as disposing of excess materials entirely were less frequently used by survey participants with only 3.5% (3) indicating that this occurred; similarly, the sale of excess materials at a discount was practiced by fewer still (3.5%, 3).

The data suggest that humanitarian organizations view retention and redistribution of excess materials as a way to ensure preparedness and continuity of service delivery. The large number of participants who selected "store for future" as an option indicates a conservative strategy employed to mitigate risks associated with potential shortages in future operations; whereas those who chose donation and/or redistribution options appear to be promoting inter-organizational cooperation. Finally, the lack of participation in disposal or discounted sales demonstrates a preference among humanitarian organizations to preserve the values of surplus supplies.

Overall, these findings indicate a trend toward resource sustainability through preparedness, cooperation, and efficient utilization of excess supplies.

Inventory Optimization

Table 2 is a summary of respondent's views concerning inventory optimization practices within humanitarian organizations. The table includes responses to various statements regarding visibility, forecasting, cost control, inventory placement and storage capacity.

Table 2: Inventory optimisation

SN	Item	1	2	3	4	5
1	A unified platform that increases visibility and gathers data from departments and	3 3.5%	17 20.0%	7 8.2%	40 47.1%	18 21.2%
2	Granular forecasts that incorporate a wealth of demand data to drive efficient inventory use at each location	3 3.5%	25 29.4%	23 27.1%	26 30.6%	8 9.4%
3	Cost-effective inventory levels that avoid overstocks	6 7.1%	21 24.7%	17 20.0%	28 32.9%	13 15.3%
4	Strategically positioned and allocated inventory	9 10.6%	35 41.2%	9 10.6%	19 22.4%	13 15.3%
5	Optimized warehouse and store capacity that smooths replenishment operations and reducing bottlenecks.	10 11.8%	19 22.4%	3 3.5%	40 47.1%	13 15.3%

Table 2 presented the respondents' views on different aspects of inventory optimisation within humanitarian organisations in Bamenda. The results showed that almost half of the respondents (47.1 percent) agreed that the use of a unified platform increased visibility and facilitated data gathering from different departments, while 21.2 percent strongly agreed with this statement. Only a small proportion (3.5 percent) strongly disagreed, and 20 percent disagreed, suggesting that most organisations acknowledged the value of integrated systems in enhancing inventory visibility.

On the use of granular forecasts that incorporate demand data to improve efficiency at each location, the responses were more evenly distributed. While 30.6 percent agreed and 9.4 percent strongly agreed, a significant share of respondents either disagreed (29.4 percent) or were neutral (27.1 percent). This indicated that forecasting practices were not uniformly embraced across organisations, possibly due to differences in capacity, data availability, or technological adoption.

Regarding cost-effective inventory levels that minimize both overstocking, 32.9 percent of respondents agreed and 15.3 percent strongly agreed, while 24.7 percent disagreed and 20 percent remained neutral. This suggested that although many organisations recognized the importance of striking a balance in stock levels, a sizeable proportion still struggled to achieve this in practice.

For strategically positioned and allocated inventory that meets network-wide demand, the largest share of respondents (41.2 percent) disagreed, while 22.4 percent agreed and 15.3 percent strongly agreed. This finding implied that many organisations faced challenges in optimally positioning their inventory across their supply networks, which could affect responsiveness during emergencies. The results indicated that 47.1 percent of respondents agreed and 15.3 percent strongly agreed that optimized warehouse and store capacity reduced bottlenecks and smoothed replenishment operations. In contrast, only 3.5 percent strongly disagreed, highlighting broad support for the view that warehouse optimization was critical for effective supply chain performance.

Pre-positioning of Supplies

Table 3 presents respondents' views on pre-positioning of supplies. It highlights how organisations approach strategic location, essential items, timing, efficiency, and preparedness in managing pre-positioned stock.

Table 3: Pre-positioning of supplies

SN	Item	1	2	3	4	5
1	Strategic Location-Supplies are stored in areas vulnerable to specific threats like earthquakes, floods, or hurricanes	9 10.6%	24 28.2%	15 17.6%	30 35.3%	7 8.2%
2	Essential Items-The stored supplies include critical items such as medical supplies, food, water, shelter materials, and non-food items	8 9.4%	30 35.3%	15 17.6%	21 24.7%	11 12.9%
3	Time- Pre-positioning occurs before a disaster strikes, ensuring supplies are readily available when needed	13 15.3%	19 22.4%	9 10.6%	37 43.5%	7 8.2%
4	Efficiency- It reduces response time and associated costs by minimizing the need for rapid and expensive logistics during a crisis	9 10.6%	34 40.0%	19 22.4%	19 22.4%	4 4.7%
5	Preparedness-Pre-positioning is a key component of disaster preparedness, enabling a faster and more effective response	12 14.1%	25 29.4%	20 23.5%	23 27.1%	5 5.9%

Table 3 presented the respondents' views on the practice of pre-positioning supplies within humanitarian organisations in Bamenda. The findings showed that 35.3 percent agreed and 8.2 percent strongly agreed that supplies were strategically located in areas vulnerable to specific threats such as floods or earthquakes, while 28.2 percent disagreed and 17.6 percent were neutral. This indicated that although some organisations made deliberate efforts to locate supplies strategically, a significant number did not consistently adopt this practice.

With regard to the type of items stored, 24.7 percent agreed and 12.9 percent strongly agreed that pre-positioning involved essential items such as food, water, shelter materials, and medical supplies. However, a notable share of respondents disagreed (35.3 percent) or were neutral (17.6 percent). This suggested mixed practices across organisations, with some fully prioritizing critical items while others faced challenges in ensuring the availability of such essential stock. The time element of pre-positioning was more strongly recognized, as 43.5 percent agreed and 8.2 percent strongly agreed that supplies were positioned before disasters struck, ensuring readiness for emergencies. Only 22.4 percent disagreed, indicating that most organisations acknowledged the timeliness of pre-positioning as a core advantage.

On efficiency, 22.4 percent agreed and 4.7 percent strongly agreed that pre-positioning reduced response time and associated costs by limiting the need for last-minute logistics. However, 40 percent disagreed, and 22.4 percent were neutral. This result implied that while the theoretical benefits of efficiency were well understood, in practice many organisations still struggled to realize cost and time savings through pre-positioning. On the preparedness dimension, 27.1 percent agreed and 5.9 percent strongly agreed that pre-positioning formed a key element of disaster preparedness. At the same time, 29.4 percent disagreed and 23.5 percent were neutral. This demonstrated that although some organisations integrated pre-positioning into their preparedness strategies, a considerable proportion had not institutionalized it as a systematic practice.

Demand Forecasting

Table 4 presents the extent to which demand forecasting practices are applied in humanitarian organisations. It covers key elements such as defining objectives, use of data, data analysis, forecasting models, and performance tracking.

Table 4: Demand Forecasting

SN	Item	1	2	3	4	5
1	Define your objectives include what you are forecasting (product sales, service usage, etc.), why you are forecasting, and your estimated timeframe for completing the forecast	11 12.9%	45 52.9%	8 9.4%	12 14.1%	9 10.6%
2	Appropriate data is used includes historical sales data, trends, economic indicators, and demographics of those in need	3 3.5%	17 20.0%	13 15.3%	41 48.2%	11 12.9%
3	Analyze the data for seasonal, geographic, and demographic factors	3 3.5%	20 23.5%	16 18.8%	33 38.8%	13 15.3%
4	Use your chosen forecasting model to project future demand	6 7.1%	13 15.3%	18 21.2%	35 41.2%	13 15.3%
5	Track actual performance to see how it compares to your forecast. Adjust the forecast periodically as conditions change	7 8.2%	32 37.6%	12 14.1%	24 28.2%	10 11.8%

Table 4 presents the extent to which humanitarian organisations in Bamenda applied demand forecasting practices in their operations. The results showed that more than half of the respondents (52.9 percent) disagreed and 12.9 percent strongly disagreed that their organisations

clearly defined forecasting objectives, such as what was being forecasted, why it was important, and the timeframe for completion. Only 14.1 percent agreed and 10.6 percent strongly agreed, while 9.4 percent remained neutral. This indicated that most organisations did not adequately articulate or document their forecasting objectives, thereby weakening the clarity and focus of their forecasting processes.

With regard to the use of appropriate data, nearly half of the respondents (48.2 percent) agreed and 12.9 percent strongly agreed that their organisations relied on historical sales data, trends, economic indicators, and beneficiary demographics to guide forecasting. However, 20 percent disagreed and 3.5 percent strongly disagreed, while 15.3 percent were neutral. This suggested that although a majority of organisations incorporated relevant data into forecasting, there remained a significant portion that either underutilized or lacked access to such data.

The analysis of data for seasonal, geographic, demographic factors was moderately practiced, with 38.8 percent agreeing and 15.3 percent strongly agreeing, while 23.5 percent disagreed and 3.5 percent strongly disagreed. Another 18.8 percent were neutral. These findings implied that while some organisations systematically analyzed demand patterns, others were less consistent in adopting this approach. On the use of forecasting models to project future demand, 41.2 percent agreed and 15.3 percent strongly agreed, while 21.2 percent were neutral. On the other hand, 15.3 percent disagreed and 7.1 percent strongly disagreed. These findings showed that a fair proportion of organisations had adopted forecasting models, but many others either lacked the expertise or the tools to apply them effectively.

In terms of tracking actual performance against forecasts and making adjustments, 37.6 percent disagreed and 8.2 percent strongly disagreed, while 28.2 percent agreed and 11.8 percent strongly agreed. About 14.1 percent remained neutral. This indicated that many organisations did not systematically evaluate the accuracy of their forecasts or revise them regularly in response to changing conditions, reducing the reliability of forecasting outcomes.

Just in Time

Table 5 presents the level of adoption of Just in Time inventory practices. It shows responses on principles such as zero inventory, demand-pull systems, small lot sizes, continuous flow, and waste reduction.

Table 5: Just in Time

SN	Items	1	2	3	4	5
1	Zero inventory philosophy - keeping the smallest possible amount of stock on hand	11 12.9%	22 25.9%	19 22.4%	24 28.2%	9 10.6%
2	Demand-pull	10 11.8%	25 29.4%	21 24.7%	26 30.6%	3 3.5%
3	Small lot sizes - ordering g in small batches more frequently	12 14.1%	24 28.2%	13 15.3%	28 32.9%	8 9.4%
4	Continuous flow supply - removing delays between supply stages	13 15.3%	36 42.4%	19 22.4%	14 16.5%	3 3.5%
5	Waste reduction - finding and eliminating activities that don't add value for customers	13 15.3%	29 34.1%	19 22.4%	20 23.5%	4 4.7%

Table 5 presents the extent to which humanitarian organisations in Bamenda adopted Just in Time (JIT) inventory practices. The results showed that 28.2 percent of respondents agreed and 10.6 percent strongly agreed that their organisations practiced the zero-inventory philosophy by keeping the smallest possible stock on hand. However, 25.9 percent disagreed and 12.9 percent strongly disagreed, while 22.4 percent were neutral. This indicated that while some organisations embraced lean inventory principles, many remained cautious about maintaining minimal stock levels due to the uncertainty of humanitarian demand.

On the principle of demand-pull, where supplies are acquired or distributed only when needed, 30.6 percent agreed and 3.5 percent strongly agreed, while 29.4 percent disagreed and 11.8 percent strongly disagreed. About 24.7 percent were neutral. These findings suggested that demand-driven practices were partially applied, but organisations were divided in their adoption, likely reflecting the balance between efficiency and the need for preparedness in humanitarian settings. In terms of small lot sizes, 32.9 percent agreed and 9.4 percent strongly agreed that their organisations frequently ordered in smaller batches, while 28.2 percent disagreed and 14.1 percent strongly disagreed. Another 15.3 percent were neutral. This showed that although some organisations practiced small-batch order to reduce holding costs, many others continued to rely on larger stock quantities to mitigate risks of shortages.

Regarding continuous flow in supply, 42.4 percent disagreed and 15.3 percent strongly disagreed, while only 16.5 percent agreed and 3.5 percent strongly agreed that their organisations effectively eliminated delays between supply stages. A further 22.4 percent remained neutral. This suggested that most humanitarian organisations had not fully achieved process flow

efficiency, possibly due to logistical challenges, bureaucratic processes, or limited technological capacity. As for waste reduction practices, 23.5 percent agreed and 4.7 percent strongly agreed that their organisations actively identified and eliminated non-value-adding activities. However, 34.1 percent disagreed and 15.3 percent strongly disagreed, while 22.4 percent were neutral. This highlighted that waste elimination efforts were not widely embraced, and many organisations still experienced inefficiencies in their supply chain processes.

Distribution and Delivery Readiness

Table 6 presents respondents' assessment of distribution and delivery readiness. It includes aspects such as inventory positioning, transportation, logistics flow, process efficiency, and use of technology.

Table 6: Distribution and Delivery Readiness

SN	Item	1	2	3	4	5
1	Inventory Management - Having the right products in the right quantities at the right location is essential	7 8.2%	20 23.5%	27 31.8%	23 27.1%	8 9.4%
2	Transportation: Ensuring that the necessary vehicles and shipping methods are available and reliable	5 5.9%	19 22.4%	25 29.4%	26 30.6%	10 11.8%
3	Logistics: Optimizing the flow of goods through the supply chain, including warehousing, order processing, and tracking.	11 12.9%	28 32.9%	15 17.6%	19 22.4%	12 14.1%
4	Process Efficiency: Streamlining internal processes to minimize delays and ensure accurate fulfillment	12 14.1%	13 15.3%	5 5.9%	40 47.1%	15 17.6%
5	Technology: Utilizing modern technologies like warehouse management systems and transportation management systems to improve visibility and efficiency	12 14.1%	22 25.9%	22 25.9%	25 29.4%	4 4.7%

Table 6 presents the extent to which humanitarian organisations in Bamenda demonstrated readiness in distribution and delivery practices. The findings showed that 27.1 percent of respondents agreed and 9.4 percent strongly agreed that their organisations ensured the availability of the right products in the right quantities and at the right locations. However, 23.5 percent disagreed and 8.2 percent strongly disagreed, while 31.8 percent were neutral. This indicated that while some organisations had effective inventory positioning strategies, many were still constrained in achieving balanced stock allocation across operational sites.

In relation to transportation, 30.6 percent of respondents agreed and 11.8 percent strongly agreed that their organisations had access to reliable vehicles and shipping methods. On the other hand, 22.4 percent disagreed and 5.9 percent strongly disagreed, while 29.4 percent were neutral. These findings suggested that transportation capacity was moderately adequate but not consistently reliable across organisations, which could affect the timeliness of humanitarian deliveries during emergencies. On the logistics dimension, which included warehousing, order processing, and tracking, 22.4 percent of respondents agreed, and 14.1 percent strongly agreed that their organisations optimized the flow of goods. In contrast, 32.9 percent disagreed and 12.9 percent strongly disagreed, while 17.6 percent remained neutral. This result highlighted that many organisations faced weaknesses in logistics optimization, limiting their ability to achieve seamless supply chain performance.

The results on process efficiency were more positive, with 47.1 percent agreeing and 17.6 percent strongly agreeing that their organisations streamlined internal processes to minimize delays and ensure accurate fulfillment. Only 15.3 percent disagreed, and 14.1 percent strongly disagreed, while 5.9 percent were neutral. This finding suggested that organisations were relatively stronger in process management, emphasizing efficiency as a key element in their distribution and delivery systems. The use of technology, such as warehouse management systems and transportation management systems, was less advanced. Only 29.4 percent agreed and 4.7 percent strongly agreed that their organisations used modern technologies, while 25.9 percent disagreed, 14.1 percent strongly disagreed, and 25.9 percent remained neutral. This indicated a limited integration of digital systems into supply chain operations, which reduced opportunities for real-time visibility and efficiency gains.

Importance of Inventory Management Practices

Table 7 presents respondents' perceptions of the importance of different inventory management practices. It compares inventory optimization, pre-positioning, demand forecasting, distribution readiness, and Just in Time.

Table 7: Importance of Inventory Management Practices

Inventory Management Practice	Not Very Important	Not Important	Neutral	Important	Very Important
Inventory optimization	12 14.1%	8 9.4%	36 42.4%	21 24.7%	8 9.4%
Pre-positioning of supplies	7 8.2%	15 17.6%	30 35.3%	16 18.8%	17 20.0%

Demand Forecasting	5	0	11	27	42
	5.9%	0.0%	12.9%	31.8%	49.4%
Distribution and Delivery Readiness	2	13	31	32	7
	2.4%	15.3%	36.5%	37.6%	8.2%
Just in Time Inventory	26	25	15	11	8
	30.6%	29.4%	17.6%	12.9%	9.4%

Table 7 presents respondents' perceptions of the relative importance of different inventory management practices within humanitarian organisations in Bamenda. The results showed that inventory optimization was considered important by 24.7 percent and very important by 9.4 percent of respondents, while the largest share (42.4 percent) remained neutral. A smaller proportion, 14.1 percent and 9.4 percent, rated it as not very important and not important, respectively. This suggested that although some organisations acknowledged the value of inventory optimization in balancing stock levels and avoiding inefficiencies, many respondents were ambivalent, indicating limited consensus on its centrality.

In the case of pre-positioning of supplies, 18.8 percent of respondents rated it as important and 20 percent as very important, while 35.3 percent remained neutral. Another 17.6 percent and 8.2 percent considered it not important and not very important respectively. These findings indicated that while a notable group of organisations recognized the role of pre-positioning in enhancing preparedness, a considerable proportion had not integrated it as a systematic practice in their supply chain strategies.

Demand forecasting received the strongest recognition among the practices. Nearly half of the respondents (49.4 percent) rated it as very important, and 31.8 percent considered it important. Only 12.9 percent were neutral, while 5.9 percent considered it not very important, and none rated it as not important. This highlighted that demand forecasting was widely perceived as a critical tool for anticipating humanitarian needs and aligning supply with fluctuating demand, making it the most valued practice in the study.

For distribution and delivery readiness, 37.6 percent rated it as important and 8.2 percent as very important, while 36.5 percent remained neutral. A smaller proportion, 15.3 percent and 2.4 percent, rated it as not important and not very important respectively. These findings suggested that while many organisations acknowledged the importance of readiness in delivery systems, others adopted a cautious stance, possibly due to logistical and resource constraints.

Finally, Just in Time (JIT) inventory was rated as the least important practice, with 30.6 percent and 29.4 percent of respondents considering it not very important and not important, respectively. Only 12.9 percent and 9.4 percent rated it as important and very important, while

17.6 percent remained neutral. This reflected limited adoption of JIT principles in humanitarian operations, where uncertainties and the need for preparedness often necessitate buffer stocks rather than lean systems.

Effectiveness of the current inventory management system in tracking inventory levels

This figure is a chart titled “Effectiveness of the current inventory management system in tracking inventory levels.” It presents respondents’ evaluation of how effective current systems are in tracking inventory.

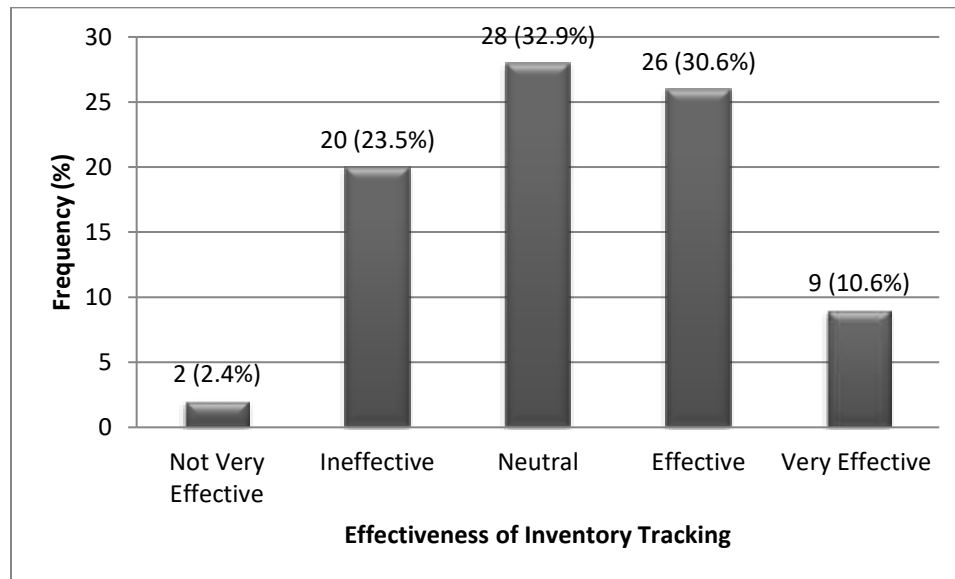


Figure 6: Effectiveness of the current inventory management system in tracking inventory levels

Figure 6 illustrates respondents’ perceptions of the effectiveness of the current inventory management systems in tracking inventory levels. The findings showed that the largest proportion of respondents, 32.9 percent (28), rated the systems as neutral, suggesting mixed or uncertain views regarding their effectiveness. A further 30.6 percent (26) considered the systems effective, while 10.6 percent (9) rated them as very effective. On the other hand, 23.5 percent (20) of respondents regarded the systems as ineffective, and 2.4 percent (2) considered them not very effective.

These results indicated that although a fair proportion of organisations recognized some level of effectiveness in their inventory systems, overall confidence in their capacity to accurately track stock levels was moderate. The relatively high neutral response suggested that many organisations experienced inconsistent performance or relied on systems that were only partially functional. The fact that more than a quarter of respondents (26 out of 85) rated their systems as

effective, and a smaller proportion (9) as very effective, showed that some organisations had achieved considerable progress in inventory tracking. However, the presence of 20 respondents who described their systems as ineffective highlighted significant gaps in accuracy, reliability, and usability of existing systems.

CONCLUSION AND RECOMMENDATIONS

This study found out that there was a positive relationship of inventory management practices on the performance of humanitarian organizations in the Bamenda Municipality. This is explained by an improvement in performance due to inventory optimization; pre-positioning; and just-in-time delivery methods at both the 1% and 5% confidence intervals. The Null Hypothesis was therefore rejected; and the Alternative Hypothesis accepted. To optimise organisational performance, the study recommends that managers prioritise Just-in-Time tracking and the prepositioning of inventory, while maintaining reserve stocks at every location to prevent emergency stock-outs. It is essential to upgrade stock tracking technology and provide comprehensive employee training to ensure data-driven, standardised inventory practices across remote sites. Furthermore, the adoption of digital technologies is particularly vital for humanitarian organisations to improve record accuracy and gain visibility across multiple supply points, which facilitates quicker decision-making regarding outsourcing arrangements and the monitoring of vendor performance.

SCOPE FOR FURTHER STUDIES

Further studies should examine the moderating or mediating role of factors such as organizational culture, funding availability, technological adoption and supply chain resilience in the relationship between inventory management practices and organizational performance.

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