



## INVENTORY MANAGEMENT STRATEGIES OF FOOD MANUFACTURING INDUSTRIES IN A DEVELOPING ECONOMY

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**ABSTRACT. Background:** Among the various food chain processes, inventory is regarded as the most important, complex and expensive. Inventory practically accounts for over 70% of food processing firms overall capital assets in both developed and developing economies. As such, its proper management is key to promoting the performance, growth and competitiveness of food processing firms and their supply chains. However, in developing economies notably Ghana, the strategies adopted by food processing firms in managing their inventories remains scanty and unclear. Thus, the aim of this article is to investigate the different inventory management strategies of manufacturing industries with focus on food processing firms in a developing economy in case of Ghana.

**Methods:** The study adopted the quantitative approach, descriptive design, and backed by the theory of constraints. It collects data through structured questionnaires from 104 food processing firms in Ghana and analysis was done using descriptive statistics (i.e. mean and standard deviation).

**Results:** The study's results revealed that food processing firms in developing economies notably Ghana most prefer the Economic Order Quantity during inventory management; followed by Strategic Supplier Partnership and the Activity Based Costing strategies respectively.

**Conclusions:** This study's findings contribute largely to empirical studies on inventory management of food processing firms in developing economies. The findings also inform policies and practices associated with inventory management, while facilitating the adoption of relevant inventory management strategies in food processing industries.

**Key words:** inventory management strategies, just-in-time, economic order quantity, strategic supplier partnership, vendor managed inventory, activity based costing.

### INTRODUCTION

The increasingly competitive nature of manufacturing industries championed by globalisation, technological advancements and demand fluctuations has highlighted the need for efficient inventory management [John et al. 2015]. Inventory management has become a vital operational weapon for firms that intend to survive competitive pressures in their manufacturing industries [Kolawole et al. 2019]. Inventory (either raw materials, semi-finished and or finished products) is key to manufacturing firms' survival as it constitutes about 70% of their current assets [Koumanakos 2008]. Failure to properly manage inventory

could have severe consequences on firms' operational performances. Also, poorly managed inventory creates huge gaps in internal controls leading to financial risks: theft and fraud schemes [Panigrahi 2013]. It could also expose firms to production and delivery delays, countless faulty products and product shortages.

The goal of inventory management is to strengthen internal controls to ensure optimal and quality inventory while providing value to customers [Sunday and Joseph 2015]. Proper management strikes a balance between too little and too much inventory [Elsayed and Wahba 2013]. Inventory below or above optimal levels could affect a firm's

productivity by increasing production costs. The theory of constraints suggests that manufacturing firms are exposed to inventory constraints arising from thefts, expiries, shortages and long lead times which could obstruct their entire systems [Gupta and Boyd 2008]. Such firms can only overcome inventory constraints and improve performance by adopting appropriate inventory management strategies [Chen and Paulraj 2004]. These strategies enable firms to monitor stock levels, forecast future demands and make proper replenishment plans [Weiss 2014]. Research has revealed common inventory management strategies to include Activity Based Costing, Economic Order Quantity, Just-In-Time, Vendor Managed Inventory and Strategic Supplier Partnership [Stevenson 2005, Khan and Siddiqui 2018].

Arguably, food processing firms hold the most delicate inventory type in terms of ease of inventory perishability [Khan and Siddiqui 2018]. Given the relatively shorter shelf life and ease of contamination of their inventory, food processing firms, in various economies are predominantly exposed to high product expiries and shortages [Taylor 2017] as compared to other firms such as automobile and plastics/rubber producers. Thus, inventories kept by food processors require proper inventory strategies to protect them from bacterial contaminants and lead poisons to minimise production cost. Although some strategies have been recognised, the extent to which these strategies are adopted by Ghana's food processing firms remains unknown. This has misled firms into adopting irrelevant inventory management strategies exposing them to high inventory wastages, unnecessary shortages and production delays. Food processing firms in Ghana could also be exposed to product quality issues, longer lead times and high production costs [Koumanakos 2008]; a situation which could have rippling effects on their overall performance levels and contributions to economic development.

Although inventory errors associated with processed foods could negatively influence firm performance and invariably affect end-consumers' health, studies on inventory management strategies focusing on developing economies notably Ghana remains limited.

Previous studies [Panigrahi 2013, Munyao et al. 2015, Chan et al. 2017] have focused on composite of manufacturing firms other than specific classes [Opoku et al. 2020] notably food processing firms. This present study addresses this research gap by investigating the key inventory management strategies adopted by the food processing firms in Ghana and how they individually contribute to inventory management. Findings would help address the menace facing food processing firms while informing policies and practices of such firms during inventory management.

The remaining issues in this paper is structured as follows: Section 2 outlines the study's material and methods used; Section 3 presents the results and discussion with support from relevant studies and Section 4 ends the paper with conclusions and suggestions for future studies.

## MATERIALS AND METHODS

The study adopted the quantitative approach and descriptive research design due to its research objectives. The quantitative approach uses descriptive and or inferential statistics to describe issues in a given study [Creswell 2014]. It also allows a study to collect and analyse data in quantitative terms to generate better objective conclusions for generalisation of findings across a target population. The descriptive design also provides accurate representation of persons, events or situations [Saunders et al. 2012]. It is advantageous in producing good amount of responses from a large group and it can also be used with greater confidence.

The study was carried out within the scope of the Ghana's manufacturing sector; focusing on food processing firms. The sector is a key part of Ghana's industrial set-up [Ackah et al. 2014]; thus, a core of industrial activities which deal with a vast range of inventory. Food processing firms primarily converts raw materials or into finished goods to meet end users' needs. There are about 142 food processing firms located within Tema, Accra and Kumasi metropolises of Ghana (Association of Ghana Industries 2018). As such, the study's population comprised 142

food processing firms. Using the census technique, information was obtained from every unit to ensure higher degree of accuracy and reliability of findings. This technique provides a fair representation of members. The respondents included production, operations and procurement or purchasing managers/officers due to their direct involvement in inventory related activities.

To achieve the study's purpose, structured questionnaire was used to gather primary data where each person is asked to respond to the same set of questions in a predetermined order. It is also suitable for a quantitative study

because it helps in obtaining objective responses for statistical analysis [Saunders et al. 2012]. The questionnaire was self-administered and obtained valid response rate of 71.84%. Table 1 further presented how the study's variables were measured to achieve the research objectives. These measurement indicators were used in constructing the study's structured questionnaire. All the measurement items were based on extensive reviews of related literature of which the indicators were put on a five-point scale ranging from "1 - least agreement" to "5 - highest agreement".

Table 1. Measurement of Variables and Sources

Variables	Measurement items	Sources
Activity Based Costing	Item classification, selective control, fund allocation, focus and periodic review	Pokorná [2016]
Economic Order Quantity	Demand, lead time and fixed orders are known and constant, procedure for determining cost components, preparation toward inventory shortages	John et al. [2015]
Just-In-Time	Proper layout of production systems, on-time supplies, communication flow, adherence to production schedules, customers' specifications	Chen and Hua Tan [2011]
Strategic Supplier Partnership	Supplier involvement, information sharing, supplier agreement, frequency of meetings and supplier capacities	Qrunfleh and Tarafdar (2013)
Vendor Managed Inventory	Supplier agreement, supplier capacity, access to information, supplier review and supplier control	Mulandi and Ismail [2019]

Source: own construct

Data obtained through survey-based researches require editing, sorting, coding, error checking and mathematical calculations. Data cleaning and screening were subsequently done to check for missing values and data consistency. Analysis was done using descriptive statistical tools comprising mean and standard deviation. The mean score, for instance, is widely used as a standard measure of central tendency [Creswell 2014]. The mean score was reported using a mean scale of 1 to 5 with mean scores of 1 to 2.9 indicating 'low', while 3 to 5 indicate high. It is, therefore, suitable for ranking results based on average scores. All the study's research objectives were analysed using this statistical tool and the result was presented in tables and discussed thereof.

## RESULTS AND DISCUSSION

The section presented the study's results and discussion based on its research questions.

### Activity Based Costing (ABC) Strategy

This section presented the description of the Activity Based Costing (ABC) strategy. The ABC strategy has generally been described using item classifications, selective control, allocation of funds, focus on valuable items and periodic review or re-categorisation. As such, the section specifically described how each indicator is adopted by food processing firms in Ghana. The result was presented in Table 2.

Table 2. Description of Activity Based Costing (ABC) strategy

Item/Indicator	Mean	Standard Deviation
Classification of items	4.16	.884
Selective control	4.08	.889
Allocation of funds	4.27	.808
Focus on valuable items	3.47	1.019
Periodic review and re-categorisation	3.75	1.122

Source: field survey

From Table 2, all the firms, 102(100.0%) agreed that they strictly allocate funds for managing inventories based on the value attached each inventory item. This result was rated 'high' because it had a mean score of 4.27 which is between 3 and 5. The standard deviation statistic of 0.808 indicates that the data points are gathered closely around the mean value confirming it as a great value. The result implies that, the firms studied apportion funds to manage inventories based on how valuable the item is. Highly valued items require more funds to manage unlike less valuable items. The result also indicated that, the firms' studied, 85(100.0%) classify their items in order of importance (M=4.16). The standard deviation score of 0.884 indicates that the mean value is great because its distribution is spread around it. This implies that, the firms studied engage in item classification which aids in apportioning funds and control. One of the major assumptions of this strategy is item classification where firms classify items on the basis of value.

Also, all the firms, 102(100.0%), had selective control over their inventory items (M=4.08; SD=0.889). The implication is that food processing firms control their inventories based on the value attached to them. Thus, highly valuable or key items could be given maximum control as compared to less valuable or routine items. The result also revealed that, the firms studied periodically review and re-categorise their inventory items (M=3.75; SD=1.122). Fluctuations in customers' demands coupled with unpredicted nature of business environments have called for firms to frequently re-categorise their items in order to meet demand. Periodic review enables firms to monitor and evaluate their inventories to ensure effective management. Finally, the firms agreed that they focused more on valuable items than other items based on the ABC strategy (M=3.47; SD=1.019). This implies that, highly valuable items receive total attention as compared to less valuable items. This is because, highly valuable items are the pivots with which production thrives; failure to provide maximum control could affect the overall success of the firm.

### Economic Order Quantity (EOQ) Strategy

The section presented the description of EOQ as a strategy adopted by food processing firms in Ghana. This was achieved by discussing the contributions of each indicator to the strategy based on their average scores (see Table 3).

Table 3. Description of the Economic Order Quantity (EOQ) strategy

Items	Mean	Standard Deviation
Demand is known and constant	3.89	.900
Lead time is known and constant	4.24	.826
Place fixed orders	4.38	.707
Specific procedure for determining cost components	4.32	.694
Preparation toward inventory shortages	3.94	1.106

Source: field survey

From Table 3, all the firms, 102(100.0%), agreed that they place fixed orders whenever inventory is below optimal level within specified time frame. This helps these firms to properly manage their inventories as fixed quantities are ordered at all times. The result was rated 'high' because it had a mean score of 4.38 with standard deviation statistic of 0.707; indicating that the data distribution is gathered closely around the mean value thus confirming it as a great value. The result implies that the firms understudy ensure that the same amount of quantity is ordered to achieve optimal inventories. Inventories below or above optimum levels are regarded as costs which could negatively affect firms' profitability levels. The firms also agreed that they have fixed and well-established procedures for determining cost components associated with inventory management over a given period (M=4.32; SD=0.739); implying that these firms do not make unnecessary expenditure on their inventories as it could tie up a large portion (70%) of their total current assets.

The study's result also revealed that, the firms studied ensure that lead time is known and constant over a specified period of time (M=4.24; SD=0.826). The result has the implication that, the food processing firms ensure continuous production because they know when to place orders and receive them within a given time frame. This minimises

production delays and help in meeting customers' demands on time. The study revealed that the firms prepare adequately toward inventory shortages (M=3.94; SD=1.106). Production wastages are largely associated with increased production costs; failure to prepare adequately towards this menace could have adverse impact on profit levels. Firms which are predominantly exposed to wastages during production are likely to spend more funds replenishing their inventories as compared to waste-conscious firms. Also, food processing firms ensure that customer demands for their products are known and constant over time (M=3.89; SD=0.900). The result implies that, the firms have implemented proper systems to ensure that the demands of their customers are constantly known and predetermined over a given time frame.

### Just-In-Time (JIT) Strategy

This section examines how the following dimensions: on-time delivery from suppliers, proper layout of production systems, quick communication among chain actors, strict adherence to production schedules and reliance on customers' specifications best describes the Just-In-Time (JIT) strategy. Using descriptive statistics, the result was presented in Table 4.

Table 4. Description of JIT strategy

Item	Mean	Standard Deviation
On-time delivery	3.65	1.088
Proper layout	3.52	1.191
Communication flow	3.61	1.059
Adherence to production schedules	3.75	1.164
Customers' specifications	2.68	1.293

Source: field survey

In terms of the Just-In-Time (JIT) strategy, all the firms agreed that they strictly adhered to production schedules (M=3.75; SD=1.293). The result implies that, the firms studied strictly follow production schedules in order to avoid or minimise production delays, production errors and wastages while ensuring customer satisfaction. Firms which strictly follow production schedules are generally able to meet customers' demands at the right time in the right quantum and at the right place thereby increasing their profit levels. Also, the

firms agreed that they have a proper layout (men, machine, material, information) that supports their production systems (M=3.65; 1.088) while eliminating waste. They also emphasis on quick communications with key suppliers during production (M=3.61; SD=1.059). Communication is one of the key elements for competitive and sustainable businesses. As such, ensuring quick and faster communication with key suppliers leads to on-time receipt of goods while minimising unnecessary errors and mistakes.

Further, it was revealed that food processing firms mostly rely on on-time supplies from key suppliers to ensure smooth production (M=3.52; SD=1.191). Thus, on-time receipt of needed inventories enables food processors to meet production levels, customers' demands while ensuring maximum outputs. Arguably, delays in receiving the needed raw materials from suppliers could lead to production delays and invariably frequent failure to meet customers' demands and this could force them to consider substitutes. However, the study's result revealed that, the firms' studied do not rely on customer specifications when making production plans. This indicator had a lowest mean score of 2.68 with a standard deviation score of 1.293. Food processing firms' emphasis on product standardisation other than product customisation requires strict adherence to customer specifications. Arguably, the nature of activities coupled with ease of perishability of inventories does not allow them to produce on basis of customer specifications.

### Strategic Supplier Partnership (SSP) Strategy

Manufacturing firms have been found to describe SSP strategy to inventory management based on supplier involvement, information sharing, supplier agreement, frequency of meetings and supplier capacities. Using the mean and standard deviation scores, Table 5 revealed how each indicator best describes the SSP strategy within the firms' studied.

Table 5. Description of Strategic Supplier Partnership (SSP) Strategy

Item/indicator	Mean	Standard Deviation
Early supplier involvement	4.27	.585
Complete information sharing	4.26	.675
Long-term agreements with suppliers	4.14	.758
Frequency of meetings	3.79	1.001
Supplier capacities	3.84	1.089

Source: field survey

From Table 5, all the firms agreed that they use early supplier involvement (M=4.27; SD=0.585) as a key criterion for describing the Strategic Supplier Partnership strategy. The result implies that the food processing firms ensure that key suppliers are involved right from product design stages through to final production. This is to ensure that their key suppliers have in-depth knowledge about the nature of inventory needed and its associated quantity, quality time and place of delivery. Indicates mean score is great because its data distribution is gathered closely around it. Also, the firms' studied emphasise on complete information sharing when describing the SSP strategy (M=4.26; SD=0.675). The result implies that, key suppliers have complete description of the inventory needed thus reducing possible wastages and/or shortages during production. Failure to proper share information with key suppliers could lead to supply delays, wrong deliveries thus failing to meet customer demands; invariably affect overall production levels and firm survival.

The food processing firms were found to establish long-term agreements with key suppliers (M=4.14; SD=0.758); leading to efficient resource integration to ensure proper inventory management. The result implies that food processing firms ensure that they enter into long term agreements with key suppliers to promote effective collaboration during production. Also, the firms studied consider the capacities of key suppliers as key criterion for describing SSP strategy (M=3.84; SD=1.089). Supplier capacity focuses on supplier's ability to meet requirements in terms of product quality, on-time supplies in right quantity while meeting set environmental standards. This implies that, the firms studied ensure that key suppliers have the required capacities to meet their needs in order to

remain competitive. Finally, the firms ensure that they organise meetings frequently with key suppliers (M=3.79; SD=1.001) in order to ensure effective exchange of vital information during inventory management. Frequent meetings and interactions among parties ensure effective information exchange, aid understanding of what needs to be accomplished while allowing each partner to carry out required activities with minimal supervision.

### Vendor Managed Inventory (VMI) Strategy

Table 6 describes how supplier agreement, supplier capacity, complete access to information, periodic review by suppliers and supplier control over inventory best explains the VMI strategy.

Table 6. Description of Vendor Managed Inventory (VMI) strategy

Item/Indicator	Mean	Standard Deviation
Supplier capacity	4.35	.612
Complete access to information	3.88	1.062
Supplier control over inventory	3.78	1.228
Agreement with suppliers	3.74	1.207
Periodic review by suppliers	3.49	1.191

Source: field survey

From Table 6, all the firms agreed that they consider supplier capacity as key criterion for describing the VMI strategy (M=4.35; SD=0.612). The result implies that, having adequate knowledge of suppliers' operational capacity promotes confidence and trust in their abilities to properly manage inventories on behalf of the focal firm. Also, the firms give key suppliers complete access to needed information (M=3.88; SD=1.062). Allowing key suppliers to have access to vital information exposes them to the nature of inventory to be kept and how to properly manage them. Firms that fail to provide needed information may stand the risk of exposure to poor inventory management as the suppliers may fail to know which inventory require more control and attention. The study also revealed that, food processing firms allow their key suppliers to have complete control over the inventories they keep at their premises (M=3.78; SD=1.228). The result implies that the firms allow their key suppliers to properly

manage inventory with minimal interferences. One of the key assumptions of the VMI strategy is key suppliers having total control over items they keep. Failure to allow to completely control the inventories could lead to conflicting interest which could invariably affect the effectiveness of inventory management.

Table 6 further indicated that, the firms ensure that they establish long-term agreements with their key suppliers (M=4.14; SD=3.74). This leads to efficient integration of assets between the actors thus promoting the exchange of valuable resources aimed at inventory management. The study's result also revealed that the firms studied consider the level of supplier agreement as a criterion for describing the SSP strategy (M=3.74; SD=1.207). Finally, the result revealed that the firms' key suppliers were allowed to periodically review inventories without their permission at all times (M=3.49; SD= 1.191). The result implies that, food processing firms which allow their key suppliers to manage inventories on their behalf also gives them the opportunities to conduct periodic reviews to ensure constant optimum inventories. However, they do not necessarily give these suppliers the permissions at all times to conduct such reviews. This in turn ensures faster reviews with minimal influence and interference from the focal firms.

### Ranking the Inventory Management Strategies

This section aimed at examining the ranking the various inventory management strategies as adopted by the food processing firms in Ghana. This was geared towards identifying the key strategy adopted by these firms during inventory management. The result was analysed using descriptive statistical tools such mean and standard deviation scores and presented in Table 7.

Table 7. Ranking Inventory Management Strategies

Strategy	Mean	Standard Deviation	Ranking
Economic Order Quantity (EOQ)	4.15	0.847	1 <sup>st</sup>
Strategic Supplier Partnership	4.06	0.822	2 <sup>nd</sup>
Activity Based Costing (ABC)	3.95	0.944	3 <sup>rd</sup>
Vendor Managed Inventory (VMI)	3.85	1.06	4 <sup>th</sup>
Just-in-Time (JIT)	3.44	1.159	5 <sup>th</sup>

Source: field survey

From Table 7, it could be deduced that, the economic order quantity (EOQ) strategy was the most adopted and used with the highest mean score of 4.15 with a standard deviation score of 0.847. It, therefore, ranks 1st among the other inventory strategies used by the food processing firms in Ghana. This means that, the firms adopt the EOQ strategy the most during inventory management. The result implies that, food processing firms in Ghana place fixed orders whenever their inventories fall below specified optimum levels. They also have specific procedures for determining the cost components associated with inventory whereas they ensure that lead time and customer demands are known and constant over time. Finally, they adopt this method in order to prepare adequately toward inventory shortages. The use of this strategy has widely been supported by the theory of constraints which suggests that firms need to adopt relevant strategies such as EOQ during inventory management in a bid to address inventory constraints. Rao and Mangal [2018] concluded that EOQ is key to ensuring successful inventory management. Atnafu and Balder [2018] also found EOQ to significantly improve firm performance and competitiveness.

The result was followed by Strategic Supplier Partnership (SSP) strategy (M=4.06; SD=0.822) which ranked 2nd among the other strategies. This means that, SSP is one of the key strategies adopted by food processing firms during inventory management. The result implies that, majority of the food processing firms in Ghana involve their key suppliers during inventory management while sharing vital information with them during regular meetings. Also, these firms have formal agreements with their key suppliers which give

them priorities over competing firms. The finding also implies that food processing firms ensure that their key suppliers have adequate capacities to handle their inventories. The result has largely been supported by Mukopi and Iravo [2015] who concluded that strategically collaborating with suppliers allow Kenya's sugar manufacturing firms to acquire high-value goods even in times of supply uncertainties. Khan and Siddiqui [2018] stressed that strategically partnering with suppliers could have a positive impact on supply chain performance. The theory of constraints also emphasises on the need for firms to collaborate with key suppliers as a strategy to manage possible constraints such as inventory.

Activity Based Costing (ABC) (M=3.95; SD=0.944) was also among the most used inventory management strategies adopted by food processing firms in Ghana (i.e. ranked 3rd). The result implies that, the firms studied manage their inventories through item classification where all their items are properly classified for easy identification. Also, the firms ensure selective control over their inventories where highly important or valuable items are given maximum control over less important items. The firms also allocate funds on the basis of item value which are periodically done. Thus, items are periodically re-categorised to ensure that highly valuable items are constantly detected and well managed. Krumwiede and Charles [2014] added that, ABC strategy also ensures proper utilisation of resources and physical control over inventory. Al-Qudah and Al-Hroot [2017] found the ABC strategy to improve firm profitability by 47.22 percent. Opoku et al. [2020] found that ABC to contribute to bettering operational performance.

The study further revealed vendor managed inventory (VMI) (M=3.85; SD=1.060) as the 4th ranked strategy adopted by food processing firms in Ghana during inventory management. The result implies that, during inventory management, these firms allow their suppliers to manage inventories at their premises by focusing on supplier capacities, how key suppliers can assess relevant information and supplier agreements. Also, they sometimes allow key suppliers to control some inventories

especially in instances where their warehouses are full. The firms also allow suppliers to periodically review inventories and replenish them as and where necessary. According to Stadler [2015], with this strategy, suppliers agree to take the responsibility for making key decisions on the amount and timing of inventory replenishment on behalf of the focal firm. In a similar vein, Wambua et al. [2015] found that VMI reduces inventory-carrying costs, stock out issues while ensuring better forecasts. However, this strategy may not be popular among Ghana's food processing firms due to their reluctance in allowing key suppliers to manage their inventories. This could be due to fear of failure on the part of key suppliers to deliver inventories as and when needed, lack of trust, poor technologies to managing inventories effectively and inadequate supplier capacities including inadequate warehouse spaces.

Finally, the Just-In-Time (JIT) strategy was found as the least used inventory management strategy with the lowest ranking (i.e. 5th). This is because, the result had the lowest mean with standard deviation scores (M=3.44; SD=1.159). The result implies that, even though the food processing firms in Ghana adopt the JIT strategy, it is the least used among the other strategies. Thus, some firms rarely adopt this strategy during inventory management and this could be argued to the complex nature of this strategy. This is because, firms which adopt the strategy constantly adhere to production schedules, on-time supplies, quick communication and well-structured layout. Also, such firms primarily produce on the basis of customer specification in order to minimise wastages and production errors which are mostly unlikely to be followed by food processing industries across the globe. Arguably, food processing firms would struggle to operate effectively on the basis of customer specification which emphasises on customisation. This could be because of how delicate their inventories are coupled with the high perishability rate if not consumed within a limited time period. These factors could make adopting the JIT strategy to managing inventories extremely difficult especially for firms in this industry. Processing foods solely on customer demands and requirements, for instance, could have severe

health implications on end users. According to Biggart and Gargeya [2002], Just-In-Time traces its origins from the automobile industry specifically the Toyota production system; thus, it is unsurprising if it is not popular among food processing industries in a developing economy such as Ghana.

## CONCLUSIONS

Based on the study's results, the made some conclusions. The study concluded that all the strategies identified contributed in diverse ways to ensuring effective inventory management of the food processing firms in Ghana. For instance, the ABC strategy is effective in managing inventories of food processing firms in Ghana by emphasising on item categorisation, selective control and selective allocation of resources and funds. The SSP strategy contributes to inventory management of food processing firms in Ghana by ensuring early supplier involvement, complete information sharing while establishing long-term agreements with key suppliers. The study also concluded that the EOQ and SSP strategies are the most used and important strategies for managing inventories among food processing firms in Ghana. On the other hand, the study concluded that, the JIT strategy is the least adopted for managing inventories of food processing firms in Ghana. However, due to its importance, some firms may be embracing it and thus, it could increase in importance over a given time period. With respect to these conclusions, the results could be used to facilitate the implementation of relevant strategies aimed at ensuring effective inventory management in food processing industries.

It seems clear that food processing firms need to place much emphasis on Economic Order Quantity and Strategic Supplier Relationship strategies in order to ensure effective inventory management to improve performance levels. The study, therefore, recommended that management of food processing firms should manage inventories by constantly monitoring customer demands, lead times and production costs. They should also involve their key suppliers during inventory management right from the design stage to the

end of the inventories' useful life. Secondly, the study's result exposes management to the significance of adopting relevant strategies during inventory management. This will inform policies and practices associated with inventory management. Proper inventory management could lead to improved firm performance with respect to high product quality, speed, flexibility, dependability while minimising production costs. The study's results will also assist management of food processing firms in Ghana to concentrate on relevant strategies aimed at ensuring proper inventory management. It is vital for food processing firms to compete effectively while remaining sustainable in today's unhealthy business environment; achievable through proper inventory management as inventories account for over 70 percent of these firms' total current assets.

The study also made some theoretical contributions by providing empirical evidence with respect to inventory management strategies adopted by manufacturing firms including food processing industries in developing economies notably Ghana. The study was conducted within the framework of theory of constraints. Despite the immense contributions of inventories to the food processing sector in Ghana, studies related to inventory management strategies have not received much recognition in the country. However, previous studies have proven that by giving relevant attention to inventory strategies, valuable proof of their associated benefits could be derived in the food processing sector in Ghana. This could help improve the overall performance levels of firms the sector and invariably increase its contributions to economic development of the country. The study's findings may also help to overcome the limited literature on inventory management strategies within the food processing sector in developing economies notably Ghana. However, the study was limited to only one class of manufacturing sector (i.e. food processing sector) in Ghana; thus, the study cannot be generalised to all classes of firms in Ghana's manufacturing sector. Future studies could look at all or other classes of firms (i.e. plastics/rubber, metal/aluminium, pharmaceuticals/chemical, etc.) in the manufacturing and service

industries. The study relied on the cross-sectional approach and as such, future research could consider using the longitudinal approach in order to provide better understanding of issues associated with inventory management. The mixed approach could then be employed to obtain in-depth information through both qualitative and quantitative means.

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## STRATEGIA ZARZĄDZANIA ZAPASAMI W PRZEMYŚLE SPOŻYWCZYM W KRAJACH ROZWIJAJĄCYCH SIĘ

**STRESZCZENIE. Wstęp:** Wśród wielu różnych procesów zachodzących w łańcuchach dostaw produktów żywnościowych, zarządzanie zapasami uznaje się za jedną z najważniejszych i najbardziej złożonych procesów. Zapasy pochłaniają ponad 70% zasobów w firmach spożywczych zarówno w krajach rozwijających się jak i rozwiniętych. W związku z tym właściwe zarządzanie tymi zapasami jest kluczowe dla zwiększenia konkurencyjności i polepszenia wyników finansowych firmy. Jednak w wielu rozwijających się krajach, między innymi w Ghanie, strategie zarządzania, stosowane przez firmy spożywcze dla zarządzania zapasami, pozostają niejasne i nieprecyzyjne. Celem tej pracy jest analiza różnych strategii zarządzania zapasami, z głównym naciskiem na firmy spożywcze, dla rozwijającej się gospodarki, na przykładzie Ghany.

**Metody:** Zastosowano podejście ilościowe jak i schemat opisowy, oparty na teorii ograniczeń. Dane do badań zebrano przy użyciu ustrukturyzowanej ankiety od 104 firm spożywczych, działających w Ghanie. Analiza danych została wykonana przy użyciu narzędzi statystycznych (m.in. wyliczając średnią i odchylenie).

**Wyniki:** W wyniku przeprowadzonej analizy, stwierdzono, że w krajach rozwijających się, na przykładzie Ghany, w większości przypadków preferowaną metodą postępowania w zarządzaniu zapasami jest metoda ekonomicznej wielkości zamówienia. Kolejnymi metodami, preferowanymi przez ankietowanych jest oparcie się o strategicznego dostawcę oraz strategia oparta o kalkulację kosztów.

**Wnioski:** Wyniki uzyskane w czasie tej pracy określają empiryczne podejście w zarządzaniu zapasami w firmach spożywczych w krajach rozwijających się oraz prezentują politykę i praktycznie stosowane strategie zarządzania zapasami w tych firmach.

**Słowa kluczowe:** strategie zarządzania zapasami, Just-in-time, ekonomiczna wielkość zamówienia, dostawca strategiczny, zarządzanie zapasem kupującego, kalkulacja kosztów

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