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Relationship between inventory management and uncertain demand for fast moving consumer goods organisations

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Abstract

This paper addresses relationship between inventory management and uncertain demand. It also assesses the effects of uncertain demand on inventory management in the fast moving consumer goods (FMCG). Inventory management should be given attention it deserves in order for the business to stay competitive, flexible for the demand and at low cost. Inventories are difficult to manage and control, and inventory managers find it challenging to know when to order and how much to order. The research was descriptive in nature and was conducted through the use of quantitative research methods. A survey questionnaire was used to collect primary data from five FMCG organisations in the manufacturing industry around Johannesburg. A sample of 255 respondents was involved in this study. According to the findings, significant relationship between inventory management and uncertain demand exists. The findings imply that poor inventory management will result in demands not being satisfied, organisations will either have too much or too little on hand, and this will result to the organisations' failure.

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1. Introduction

The fast moving consumer goods (FMCG) organisations are fast, active organisations with variety of items [1]. The FMCG organisation is acknowledged as a frontrunner where supply chain management is concerned [2]. According to [3] there are four foremost categories for FMCG

organisation: personal care, foods, home care, and refreshment. This is confirmed by [4] under operational review categories of first quarter stating that high essential sales of the quarter has been caused by the gains in the market share of all four categories. FMCGs are regarded by means of marketing goods commonly transacted and consumed in a short period of time, or in one year [5]. [6] also acknowledged by saying FMCGs have a vast customer demand and the manufactured items depreciate fast due to little product life shelf. Inventories are essential for the success of the manufacturing organisations. Inventories may include raw materials, work-in-progress, consumables, and finished products for sales. For the success of the organisation in this competitive sector depends on the functioning of their kind inventory management [7]. Inventory management's role is about the balance in relation to the minimisation of total cost and expansion of customer satisfaction. These roles are not simple, to content because of effects involved and intermittent events on uncertainty of demand [8]. [9] agrees that there is massive variance of uncertainty across countries; developing countries are the most affected than the developed countries. Inventory management is about low inventory levels, low prices, and high customer satisfaction; value added procedures and processes which are profitable [10,11,12].

2. Statement of the problem

Inventory establishes a major section of organisation's investment. Significantly, the achievement or misfortune of a business depends upon its inventory management performances. Managing inventory poorly leads to sales declining and may cause the business to fail [13]. [14] acknowledges that business failures are because of too much on hand or too little stock on hand. According to [14] the development of inventory management grew significantly and the implementation of skilled organisation procedures on inventory management is very important.

The problems is inventory managers fail to meet the demand and this might be due to the uncertainty of the environment we live in and meeting demand is of significance for FMCG manufacturers today. This may be rather caused by poor inventory management which entails the way the inventory systems and methods are implemented and how the employees are trained to work on those systems and the uncertain demand which entails the way the organisation receives purchase orders from the customers.

3. Research Hypothesis

The following hypothesis was tested in this research:

Ho¹: There is a positive significant relationship between inventory management and uncertain demand.

Ha¹: There is no positive significant relationship between inventory management and uncertain demand.

4. Literature Review

4.1 Inventory Management

Inventory management involves different activities which are performed by management to minimise cost, maintain production, constant stock and reduce loss [15].

According to several scholars there are types of inventories [16,17,18,19], which are the;

- Buffer inventory is also called the safety stock. This kind of inventory is for when unexpected uncertainties of demand and supply arises.
- Cycle inventory is for when the stage in the process is unable to supply according to the demand, the build ups of inventory products are available while processing the other products.
- Decoupling inventory happens when the working stages can function reasonably and independently.
- Anticipation inventory is accumulated for future demand and unanticipated supply interruption.
- Pipeline inventory exist due to material cannot be transported all at once.

Holding best possible levels of inventory is very essential in any organisation, this is due to having too much of inventory will create holding costs on inventory such as (space rent costs, costs of decision making, old unused stock costs, damages, theft) and insufficient inventory is very costly as consumers may stop supporting the organisation but go to competitors [20]. The primary aim of a good inventory management is to excel in customer satisfaction and offer the vital customer service in control of the lowest everyday inventory costs. Good customer service is resulted from ordering the right materials and quantities of the stock at the right time. Inventory optimisation tools assist organisations generate consistent decisions on ordering of products. Making these correct decisions increases efficiency by improving the forecasting of future demand [21].

Creating, applying, and managing of processes, procedures and systems are all purposes included in the inventory management [22]. According to [23] they're two most known systems to inventory management, which are; the periodic and continuous (perpetual) inventory systems. In a continuous inventory system, purchase order is placed for the continual quantity each time the inventory on hand reaches the reorder point level, whereas in periodic inventory system, purchase order is placed for a variable quantity after the definite fixed time interval [24]. According to [8] continuous system is normally used for Class A items, which are about the great percentage of the total value of the inventory on hand. The Class A inventory on hand should be as low as possible and safety stocks put at minimal. It is all about the accurate demand estimations. Demand is uncertain mostly due to changes from purchase orders and unpredictable events.

4.2 Inventory Management Model

The key determination on all inventory models is about answering the primary questions; how much to order and when to order. Inventory fulfils many important functions in an organisation [25,8] and to keep total costs at minimal. Inventory model like; economic order quantity (EOQ), is for the purchase order that are placed at fixed order quantity and that helps with minimizing the total inventory cost. [26] explains three types of inventory costs. Inventory costs are different according to the type of the business and extremely high [27] and the acknowledgement generally is that carrying/holding costs represent a quarter (25%) of on hand inventory value. The three types

of inventory costs that are alarms the inventory model are; carrying costs, ordering costs, and shortage costs.

4.3 Inventory costs

Lower inventory cost is certain benefit for the organisation that successfully controls the inventory. When making inventory management decisions of any nature, there are costs that need to be considered. Effective inventory control cut down these costs since it cuts the total volume of inventory required to operate the organisation. Inventory control checks and tracks the levels of inventory and proactively manages obsolescence and deterioration by ordering in proper volumes [28]. When the costs are up so is the inventory levels and the direct and indirect costs will be measured [29]. The following costs have to be considered [30]:

Holding (or carrying) costs. This kind of cost broadly covers most kind of costs that are caused by storing stocks, the stock will need to be taxed, security and insured against theft and natural disasters, and there will also be the obsolescence and depreciation of stocked items.

Setup costs (also known as production change costs). For production to change from one batch of product to another different batch of product is about acquiring the material needed and organising the production machine for setups and also cleaning out material used from the previous batch.

Ordering costs. This type of cost is about the administrative costs in dealing with creating a manufacturing or procurement order. Ordering costs take into account all the information, for instance checking the products when delivered, and computing manufacturing or procurement order quantities. A system that deals with tracking of orders is included in this type of cost.

Shortage costs. When there is stock out, there will be placing of procurement order or cancellation of an order and this will cause waiting for the stock. When demand is not achieved is referred to as stock out and it causes orders to be cancelled.

According to [30] effective inventory control impacts on storage costs by reducing the costs, which is ordering enough inventories to fulfil the demand of consumers.

4.4 Uncertain demand

Uncertainty causes great challenges in production planning and control [17]. According to [24] inventory system models take into account that there is certain or uncertain demand and supply. However, reality is demand changes at all times caused by the changes on orders, random capacity of suppliers and unpredictable events such as weather, machine breakdowns and human errors [8]. When we discuss uncertainty, safety stock is required to cover the possibility of stock outs created by uncertain demand. When there is demand uncertainty, the use of constructed EOQ on regular demand will most highly influence on stock-out [32]. Thus, to overcome the threat of stock-out is by increasing the reorder point by putting extra stock which is safety stock. The spare stock preserved to cover the possibilities of stock-outs which may be caused by supply or demand variation is defined as logistician's expression in safety stock terms [33]. According to [32] safety stock is extra planned on-hand inventory that guards against the possibility of stock outs.

5. Method and Material

The study was conducted primarily through the survey method of the employees who deal with inventory control on a daily basis from the FMCG organisation in Gauteng, South Africa. The secondary data were obtained through textbooks, internet, and journal articles. The population for selected FMCG organisations was 903 personnel comprising of Top Management, Middle management, and Operational staff. The sample of 450 personnel for this research was generated from the population of fast moving consumer goods organisations in Gauteng, Johannesburg. The sample signified the subdivision from the population and probability sampling was used to give a just and fair chances to every sample group to be nominated to take part in the study. 450 questionnaires were distributed to the respondents by hand and 285 questionnaires were received back. Out of the 285 received back 30 questionnaires were incomplete or partially filled and the researcher had to reject them. The researcher received a response of 255 which is equivalent to the rate of 57 %. The analysis was descriptive in nature.

6. Data Analysis

The aim from of variable 1 was to establish whether inventory types are considered when managing the stock. According to Table 1, the majority of respondents (57%) agreed that inventory types are considered when managing the stock. Only 21% and 22% of the respondents disagreed and were undecided respectively that inventory types are considered when managing the stock.

The aim of variable 2 was to establish whether demand uncertainty have effects on the inventory management. According to Table 1, the majority of respondents (72%) agreed that demand uncertainty have effects on inventory management. Only 12.6% and 15.3% disagreed and were undecided respectively that demand uncertainty have effects on inventory management. Data that was collected from respondents were captured; analysed and descriptive statistics was used to deliver responses about research questions and hypothesis set with Pearson’s Correlation and linear regression at 0.05 alpha level.

Table 1: Coded responses for inventory management and uncertain demand

No.	Questions	S.Agree		Disagree		Undecided		TF
		F.	%	F.	%	F.	%	
1	Inventory types are considered when managing the stock	146	57.2	54	21.2	55	21.6	255
2	Demand uncertainty have effects on inventory management	184	72.2	32	12.6	39	15.3	255

TOTAL	330	86	94	510
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Source: fieldwork 2015

Table 2: Descriptive Statistics between inventory management and uncertain demand

	Mean	Std. Deviation	N
Inventory management	3.4843	0.60723	255
Uncertain demand	3.6790	0.79472	255

Table 2 indicates that the descriptive statistics of inventory management and uncertain demand of the results have a mean value greater than 3.20 and the standard deviation that is below 1. The greater the score of the Mean value means that there is a high agreement on the two variables and the relationship is significant. Thus the mean value of 3.4843 (see table 2) indicates that the majority of respondents considers inventory types when managing the stock. A standard deviation of 0.60723 indicates that there was less spread of responses to this variable.

Hypothesis: null and alternative:

Ho¹: There is no positive significant relationship between inventory management and uncertain demand was rejected.

Ha¹: There is a positive significant relationship between inventory management and uncertain demand was accepted.

Table 3: Correlation between inventory management and uncertain demand

		IMS	KD
IMS	Pearson Correlation		.486**
	Sig. (2-tailed)	1	.000
	N	255	255

KD	Pearson Correlation	.486**	1
	Sig. (2-tailed)	.000	255
	N	255	

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

Table 3 indicates the Pearson correlation coefficient for inventory management and uncertain demand. When it comes to correlation coefficient, it displays 0.486. The rate shows the correlation that is significant at 0.05 level (2-tailed) and suggests there is a positive linear relationship between inventory management and uncertain demand.

7. Discussion of Findings

After testing of the hypothesis, it was discovered that a positive significant relationship between inventory management and uncertain demand exist at ($r = 0.486$, $p < 0.05$). This implies that when the levels of uncertainty are low it will lead to better and well controlled inventory management. Rai (2012) explains that inventory management should tie the inventory with customer demand.

8. Conclusion

This research contributes to the existing literature on FMCG organisations by finding out if a relationship between Inventory management and uncertain demand exist. 72.2 % of the respondents indicated that demand uncertainty have effects on inventory management by agreeing to the statement, there is a strong positive effect between these variables hence the higher the uncertainty on demand the more difficult and challenging of holding stock in an organisation. The organisations should consider implementation of effective demand and forecasting techniques. FMCG organisations should consider the types of inventory and how they should be managed in order to meet the consumers' needs. It is important to any organisation's success and growth to understand the calculations of safety stock in order to cover risk of stock-outs. When the inventory models are not calculated correctly, it may lead to too much inventory tying up the organisation's investments or too little inventory which will cause shortages. Proper inventory management of any organisations saves the organisation from poor quality products and production, disappointing the customers, losing profits. When inventory types are known and used in an organisation, there will be little of uncertainty that will be experienced in the organisation concerning meeting customer demand. The relationship that exists between inventory management and uncertain demand should be recognized by the organisations in order to meet demand and for the inventory to be at its level best.

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