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The Relationship between Inventory Management and Productivity in Ghanaian Manufacturing Industries

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Abstract:
Many firms consider inventory management as a basis through which companies can achieve competitive advantage in the market and increase customer satisfaction and internal productivity. This study aims to evaluate the relationship between inventory management practices and productivity at Guinness Brewery Ltd. A case study involving semi-structured questionnaires was conducted with workers at Guinness Brewery Ltd. A purposive sampling was used to select 60 workers. While the study found no significant relationship between inventory practices at Guinness Brewery Ltd. and productivity such that the inventory practices were not significantly related to productivity ($p>0.05$), the study maintains that it is not out of place that most studies confirm a relationship between inventory practices and productivity.

Keywords: *Inventory, management, productivity, performance, stock*

1. Introduction

Inventory control is a critical problem in manufacturing systems. Inventory shortage significantly affects system productivity, while excessive stocks increase the operation cost (Jiangab et al., 2011). However, there is increasing emphases on inventory management as a basis through which companies can achieve competitive advantage in the market and increase customer satisfaction and internal productivity. Following this, a lot of companies make optimization of management inventory their primary objective and channel the company's large investments to streamline their inventory management in order to increase customer satisfaction and internal productivity (Shang and Seddon, 2002). The importance of inventory has implications that cut across the financial and economic performance of the company (Bertolini and Rizzi, 2002). Inventory practices of most firms takes huge percentage of their total budget, whiles inventory control is overlooked by management. Many firms have huge amount of cash tied up sitting for a long period because of the floppy inventory management or incapacity to control the inventory efficiently. Poor inventory management therefore translates directly into strains on a firm's cash flow (Christopher and Peck, 2004). Hence, it is broadly recognized that an ideal inventory management policy allows companies to achieve higher production levels which have a substantial effect on the profit margin of the firm. Recently inventories are used as buffer by majority number of companies between processes out variations and handling uncertainty. With a volatile market creating stochastic demands and a production process working best under economies of scale, inventory can be seen as a way to balance these conflicting goals.

Indeed, while efforts to lower inventory holding cost through inventory rotation is of high priority to firms, there is inadequate information to inform management of organizations the effective inventory management practices to achieve their set performances. The current study is restricted to evaluating the relationship between inventory management practices and productivity.

2. Literature Review

The term inventory refers to any idle resource that can be put into future use (Mahadevan, 2010). This may be a stock of any item used in an organization (Boyer & Verma, 2010). They are the tangible material assets of a company except the fixed assets. Conversely, inventory comprises any finished product or merchandise ready for sale, any parts or material to be incorporated into products, and whatsoever, consumed in the course of manufacturing the produce or carrying out the business. According to Tomar (2009) inventory must be kept "in-house", on the premises or nearby for immediate use; or it may be held in a distant warehouse or distribution center for use. With the exception of firms utilizing just-in-time methods, more often than not, the term "inventory" implies stocks of raw materials, parts, semi-finished goods, and finished goods which a company's keeps in expectation of demand for production purposes and/or to satisfy the needs of consumers.

Inventory management is recognized as the policies and procedures which steadily determine and regulate which things are kept in stock and what quantities of them are stocked (Kennedy et al., 2002; Mogire etal., 2008; Solis et al., 2008). This will be influenced by market intelligence and forecasting; the latter being based on one or both of two systems. For each item stocked, decisions are needed as to the size of the requirement, the time at which further supplies should be ordered and the quantity which should be ordered (Breivik et al., 2004; Berg et al., 1996; Cohen and Bailey, 1997).

Goldratt et al., (2000) identifies inventory as one of the factors for assessing business performance in a manufacturing environment. This is because good inventory management is essential to achieving business objectives and building competitive advantage (Watson et al., 2007). The focus of inventory management is to find out information technology software that limits operating uncertainty and thus reduce safety stock requirements (Baker, 1985). In other words, inventory management purpose is to balance the need for minimizing stock holding and handling cost (Waters, 2008; Rushton, 2010). Computer-based inventory control systems help businesses to provide high-quality service to customers while minimizing investment in inventory and inventory carrying costs (O'brien et al., 2002; Zipkin, 2000; Song and Zipkin, 2009).

The commonly and the most use method of reducing inventory is the economic order quantity (EOQ) model (Schwarz, 2008). Economic order quantity EOQ is a method for balancing purchase ordering, carrying and stock out costs to obtain the most favorable quantity for purchase order. EOQ technique stress on cost trade-off between two fundamental costs with inventory, thus, inventory holding costs which come about increasing more and more of the inventory. And also ordering costs which emerge as a result of decreasing the quantity ordered. Just-in-time (JIT) inventory system always involves minimizing inventory at each production facility.

Some studies in organization management designate different usage pattern in various inventory types. Rabinovich and Evers (2002) showed that re-order point methods in controlling material flows in raw material inventories was less used than the Manufacturing Resource Planning which is significantly adopted by work in progress and finished goods inventories (De Vries, 2007). The differences in adoption patterns between the studies are to some extent explained by when they are conducted. In a study by Jonsson and Mattsson (2006) for example, they showed that Manufacturing Resource Planning has reinforced its position as the utmost essential material planning method and that the re-order point method reduced in importance for the period 1993 and 1999 (Faulkner, 1989; Raj et al., 2008). The re-order point method is still the second most used method in industry.

Most studies have found the performance of the material planning method in different ways which is characterized that it should establish a good foundation for achieving high functioning performances. This happens in terms of tied-up capital, costs and customer service (Gurrola-Gal et al., 1999; Ivert, 2012; Su and Lu, 2003). It should also be friendly with the user such that it is easy to appreciate and practice and effective to work (Su & Lu, 2003). Effective performances can be lower if used in an unsuitable situation (Berry and Hill, 1992; Berry and Cooper, 1999). According to Johnson and Mattsson (2003), material planning methods are completed in four types of manufacturing environments. In methods of organizing products to order, all material planning methods were suitable but research has found that Manufacturing Resource Planning had the best fit. Spearman et al., (1990) and Spring and Dalrymple, (2000) said Manufacturing Resource Planning accomplishes well in processes making complex customer products, but Kanban does not. In production of uniform products, studies have found that the re-order point method is recognized as the best fit coupled with Manufacturing Resource Planning. Also in mass production all methods performed well however, Kanban had the top fit. It was further identified that batch production of consistent products had expressively more fulfilled material planning users compared with other situations (Goddard, 1982). This means that there are changes in the material planning between environments (Spring and Dalrymple, 2000).

3. Materials and Methods

This study employed a case study design with quantitative method. The primary purpose of the case study was to study and understand the phenomenon in details and provide objective findings within a limited time frame (Yin, 2009; Creswell, 2013). The study which was conducted at the Guinness Brewery Ltd. targeted population workers. The purposive sampling method was used sample the top management and junior staff workers who formed the accessible population. Considering the current staff strength of Guinness Brewery Ltd., 75 questionnaires were issued out for the data collection. Out of these, a total of 60 top management and junior staff workers participated and responded to questionnaires. The data were analysed using multiple regression analysis to examine the relationship between inventory management practices and productivity.

4. Results

Inventory enables a company to support the customer services and manufacturing activities in situations where purchasing or manufacturing of the items is not able to satisfy the demand (Mentzer et al., 2001). A good inventory system is important as it can maintain proper relationship between sales and inventory. In an organization where there are no inventory control procedures, the store or department can become overstocked or under stocked which has effect on the productivity of such organization (Gunasekaran and Ngai, 2005; Kuk, 2004; Surjadjaja et al., 2003). This specific objective focuses on the relationship between inventory management practices and productivity of Guinness Brewery Ltd.

Table 1 presents results on the regression analysis of inventory management practices on productivity. The R-Square of 0.07 suggest that the proportion of variance in productivity that can be explained by inventory management practices is 7%. The productivity level however has no significant relationship on the type of inventory management practices ($p>0.05$).

Independent variable	Coefficient	95% CI	Std error	t-stat	p-value
Establish Maximum, Minimum and re-order	0.42	-0.65, 0.73	0.32	0.17	0.9
Stock taking (ref=yes)	-0.16	-0.94, 0.60	0.36	-0.46	0.65
Type of supplier	1.80	-0.19,	0.09	0.00	1.00
Inspection of commodities	-0.20	-0.76, 0.37	0.27	-7.66	0.45
Constant	1.58	0.45, 2.71	0.52	2.99	
N 60					
R squared 0.07					

Table 1: Regression of inventory management practices and productivity
Outcome variable: Productivity

5. Summary, Conclusions and Recommendations

Existing literature have suggested that more often than not, the term "inventory" implies stocks of raw materials, parts, semi-finished goods, and finished goods which a company's keeps in expectation of demand for production purposes and/or to satisfy the needs of consumers. However, having identified and discussed the relationship between inventory management practices and productivity at Guinness Brewery Ltd., the study in a whole revealed that there is no relationship between inventory practices and productivity at Guinness Brewery Ltd. as the regression results finds no significant relationship ($p>0.05$). While the study found no significant relationship between inventory practices at Guinness Brewery Ltd. and productivity such that the inventory practices were not significantly related to productivity ($p>0.05$), the study maintains that it is not out of place that most studies confirm a relationship between inventory practices and productivity. However, conclusion can be made that the proportion of variance in productivity that can be explained by inventory management practices is 7%.

Since the there is increasing emphases on inventory management as a basis through which companies can achieve competitive advantage in the market and increase customer satisfaction and internal productivity, it is recommended Guinness Brewery Ltd. must maintain the optimization of management inventory as their primary objective and channel the company's large investments to streamline their inventory management in order to increase customer satisfaction and internal productivity.

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