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Inventory management practices impact on gross profit margin: A study on beverage, food and tobacco sector listed companies of Sri Lanka

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Abstract

Inventory is a vital part of current assets and huge funds are committed to inventories as to ensure smooth flow of production and to meet consumer demand. Effective and efficient inventory management goes a long way in survival of a business firm. And Inventory management plays an essential role in balancing the benefits and cost associated with holding inventory. So this study investigate inventory management practices effects on gross profit margin of the companies in beverage food and tobacco sector, Sri Lanka Colombo stock exchange. A panel data from 2012 to 2016 was gathered for the analysis from the annual reports of 20 beverage food and tobacco sector firms considered. The multiple regression model was applied in the data analysis to find out the relationship between inventory management practices and gross profit margin. The variables used include inventory conversion period, operating cycle, current ratio, cash conversion cycle and gross profit margin. The results provide that inventory conversion periods, operating cycle have a significant positive relationship with gross profit margin whereas cash conversion cycle has negative relationship with gross profit margin. In addition to that, inventory management has significant impact on the profitability measures of gross profit margin.

Keywords: Inventory Management; Beverage Food and Tobacco sector; Gross profit margin

1. Introduction

Maintaining a suitable level of inventory is a key issue to firms' operational performance and inventory plays a significant role in the survival of all organizations via supporting to growth. Managing assets of all kinds can be viewed as an inventory problem; the principles used in inventories can also be applied to cash and fixed assets too. Usually, the literature of inventory focuses on production and procurement as the principal determinants of corporate inventory policy and management. In this sense, the trade-off between ordering costs and holding costs characterizes the transactions approach to inventory management represented by the Classic policy model and Economic Order Quantity (EOQ) models of inventory developed many decades ago. In recent years, as the field of operations management has developed, many new concepts have been added to the list of relevant inventory control topics (Koumanakos, 2008).

The just-in-time (JIT), material requirements planning systems (MRP) and enterprise resource planning (ERP) methods while another emerging stream of studies postulates that the characteristics of a firm's demand and marketing environments also play an important role in determining optimal corporate inventories and these are more management-oriented. Notwithstanding the theoretical or practical shortcomings inherent in these concepts and techniques, their application in real business life should have an effect in firms' performance (Koh et al., 2007).

Building on this intuition, our purpose of this study is to explore the impact (if any) of inventory management on Sri Lankan Beverage Food and Tobacco company's gross profit margin. Inventory conversion period (ICP), current ratio (CR) operating cycle (OC) and cash conversion cycle (CCC) serve as our proxy for the implementation of inventory management whereas gross profit margin was used as the profitability of beverage food and tobacco Companies of Sri Lanka.

Most literature texts declare that cost minimization or profit maximization is the main criteria for optimal inventory management, for example, an inventory manager's goal is modeled at minimizing cost or maximizing profit while satisfying customers' demands. The com-

bined impact of demand planning, inventory optimization, and profit maximization can result in huge savings through reduced inventory in the system, lower clearance costs and better financial efficiencies. However, it is a large effort and it impacts a large number of users in an enterprise.

Too much inventory consumes physical space, creates a financial burden, and increases the possibility of damage, spoilage and loss. Furthermore, excessive inventory frequently compensates for inefficient and sloppy management, haphazard scheduling, poor forecasting, and inadequate attention to the process and procedures. Conversely, too little inventory often disrupts business operations, and increases the probability of poor customer service. In many cases good customers may become furious and take their business somewhere else if the desired product or service is not immediately available.

In the operations management literature, the question of how much inventory a firm should keep has been extensively studied even though there is dichotomy in the views given that inventory is both an asset and a liability. In the empirical evidence of the inventory management-performance relationship also produced mixed results. Specifically, Milgrom and Roberts (1988) and Dudley and Lasserre (1989) indicated that timely and informative customer demand data can result in improved profitability through reduced inventories. Deloof (2003) documents a significant negative relation between gross operating income and the number of inventories days for a sample of non-financial Belgian firms during the period 1992-1996, suggesting that managers can create value for their shareholders by reducing the number of inventories days to a reasonable minimum. Huson and Nanda (1995) proved that the improvement of inventory turnover (following JIT adoption) by a sample of 55 firms led to an increase in earnings per share. Additional evidence from Belgium is provided by Boute et al. (2004), who found no overall decrease of inventory ratios despite any increased focus on inventory reduction and Boute et al. (2006), who concluded that companies with very high inventory ratios have more possibilities to be bad financial performers. This is consistent with the findings of Shin and Soenen (1998), which reported a strong negative relation between the cash conversion cycle and corporate profitability for a large sample of public American firms.

Hassan, et al. (2014) examined the effect of working capital management on the performance of listed non-financial firms in Pakistan. Ordinary Least Square technique was employed to analyse data collected from non-financial firms listed on the Karachi Stock Exchange for the period 2007 to 2010. Among the independent variables used as proxy for working capital management, average age of inventory had a positive insignificant relationship with gross profit margin and return on assets.

Chen et al. (2005) in their views of inventories policies, reported that firms with abnormally high inventories have abnormally poor stock returns, firms with abnormally low inventories have ordinary stock returns while firms with slightly lower than average inventories perform best over time. Furthermore, in other study of Shah and Shin (2007) examined the empirical associations among three constructs – inventory, IT investments and financial performance – using longitudinal data that span four decades, where they conclude that reducing inventories has a significant and direct relationship with financial performance.

Contrary to the findings of the aforementioned studies, Balakrishnan et al. (1996), with the use of a small sample size though (46 firms), reported that the accounting performance of JIT adopters declines slightly compared to a matched sample of non-adopters. Further, Rotemberg and Saloner (1989) reported that a commonly identified positive association between corporate inventories and sales is greater for more concentrated industries.

Given that the results from the above few empirical studies of inventories impact on profitability are somewhat contradictory, so our study will try to shed more light to tests this issue with recent sample of Sri Lankan Beverage Food and Tobacco Companies.

The use of Sri Lankan evidence may lead to an assessment of the general applicability of inferences drawn from relevant research in different countries. To sort out the independent effects of inventories management in firms' gross profit margin (as a measure of profitability) we utilized a linear regression model estimated by this representative sector and for the financial years from 2011/2012 to 2015/2016.

2. Problem Statement

Many of the organizations fail to scrutinize their investment in inventory is found in the quest to maximize return on investment (Sitienei and Memba, 2016). This is unfortunate because improving the way an organization controls and manages inventory may have the greatest potential for improving the organization's bottom line (Schreibfeder, 2004). According to Temeng et al (2010), if the inventory properly managed, organizations can make potential savings but most of the organizations have continuously ignored it. For this purpose inventory should be treated as a necessary asset and requiring management.

Beverage Food and Tobacco is an essential sector to Sri Lanka and plays an important role in terms of its substantial contribution towards the growth in Gross Domestic Product (GDP) of the country (LKR 258,862 million in 2014 and annual growth rate for 2018 first quarter is +06.4%), which is necessary for the country's socioeconomic growth and development. In the year of 2014, Beverage Food and Tobacco sector also was as the most performing sector in market. Recently, there has been a growing demand of Beverage food and Tobacco from hotels and tourism development activities. The government's industrial policy is to encourage investment in Food and Beverages industries as Sri Lanka has a comparative advantage. The Board of Investment (BOI) offers various incentives for investors. Also, Research Institutions conduct various programs to develop R and D facilities and Government related institutions offer training and upgrade skills of the technical staff.

As such, the increased demand has increased sales for Beverage, Food and Tobacco companies but it poses a great challenge with regards to inventory management of these companies in the country (Labour Market and Socio-economic Information Directorate (LMSID), Service Canada, Ontario). The rapid demand for Beverage, Food and Tobacco has augmented the inventory problem hence the need for effective and efficient inventory management. It is on this argument that this study aims to analyze the impact of inventory management on gross profit margin (as profitability) of Beverage, Food and Tobacco sector companies listed in the Colombo Stock Exchange (CSE), Sri Lanka.

3. Objectives of the Study

The objective of the study is to identify the impact of inventory management practices on gross profit margin as profitability of listed companies in beverage food and tobacco sector in Colombo Stock Exchange in Sri Lanka.

4. Research Questions

RQ1: Do inventory management practices have an impact on gross profit margin of listed companies in the beverage food and tobacco sector in Sri Lanka?

RQ2: What is the relationship between inventory management and gross profit margin of listed companies in the beverage food and tobacco sector in Sri Lanka?

5. Significance of the Study

The study is to help investors beverage food and tobacco sector firms comprehend the impact of inventory on the gross profit margin of beverage food and tobacco companies in Sri Lanka, and we hope that it helps technical individuals to employ effective control techniques in order to improve on their sector firm's works for maximized the profit. Further, this study is aimed to add knowledge to the existing literature about inventory management and gross profit margin of beverage food and tobacco sector companies in Sri Lanka.

6. Review of literature

Inventory is the stock purchased with the purpose of resale in order to gain a profit. It represents the largest cost to a manufacturing firm. For a manufacturing firm, inventory consists of between 20% and 30% of the total investment (Pedro Juan García-Teruel, Pedro Martínez-Solano, 2007).

Hopp and Spearman (2000) classify inventory into raw materials, work in progress, finished goods and spare parts. Raw materials are the stocks that have been purchased and will be used in the process of manufacture while work in progress represents partially finished goods.

Sekeroglu, and Altan (2014) say relationship between inventory management and profitability was analyzed with correlation and regression analysis. Accordingly, it is determined that there is a positive relationship between inventory management and profitability in eatables industry. According to the results, for the firms operating in the eatables industry, the more their inventories converted into money, the more profitability ratios included in analysis. In other words, if the firms operating in this sector sustain their inventory management policies effectively, they increase their profits.

In Ghana, Prempeh (2015) studied the impact of efficient inventory management on the profitability of manufacturing firms by using raw material inventory management and profit as variables. Cross sectional data from the company annual reports of four manufacturing firms listed in Ghana Stock Exchange were analyzed using multiple regression techniques and Ordinary Least Squares (OLS). The study found a significantly positive strong relationship between raw material inventory management and profitability.

In 2012 Gupta and Gupta concluded in their one of the study as “the efficient management and effective control of inventories help in achieving better operational results and reducing investment in working capital. It has a significant influence on the profitability of a concern thus inventory management should be a part of the overall strategic business plan in every organization.”

Salawati, Tinggi, and Kadri, (2012) observed the impact of inventory management on performance. They empirically studied the relationship between inventory management and firm performance on a sample of financial data for 82 construction firms in Malaysia for a period 2006-2010. They employed regression and correlation technique to analyze their findings. Their finding was that inventory management is positively correlated with firm performance. Their study focused only on general performance of the firms using financial change as a performance indicator.

Adeleke, A and Aminu (2012) found as efficient and effective management of inventories also ensures business survival and maximization of profit which is the cardinal aim of every firm. More so, an efficient management of working capital through proper and timely inventory management ensures a balance between profitability and liquidity trade-offs.

In Greece, Koumanakos (2008) carryout a study to find the effect of inventory management on firm performance in manufacturing firms operating in three industrial sectors. For this purpose, period of 2000 – 2002 considered and food textiles and chemicals sectors were used in this study. The study hypothesis of that lean inventory management leads to an improvement in financial performance of the firm was examined. The findings explored that the higher the level of inventories preserved (departing from lean operations) by a firm, the lower the rate of return. In Malaysia.

Considering all the literatures relating to this research it can see there are positive and negative relationships between profitability and inventory management. And most of the studies reviewed concentrated on conventional firm level variables such as inventory levels, demand and lead time. Sometimes the conclusions depend on the variables and population or sample which they used. However it is important to make sure that is there any relationship among these factors or not. In Sri Lankan context there are no significant researches relating to this topic. As well as most of those researches used different samples.

Furthermore according to the past studies, inventory convention period, current ratio, operating cycle and cash conversion cycle are used to measure effectiveness of inventory management for this study. In this study the Inventory management ratios are used to measure of Inventory management of the firms and therefore it is the independent variables.

7. Methodology

7.1 Data

This study mainly uses its source of data as financial statements from the selected companies' annual reports. Mainly the data from balance sheets and income statements were taken over 5 years from 2012 to 2016. All this collected financial data are in terms of Sri Lankan currencies of Rupees. The purpose of getting 5 years period of data as balanced panel data set, and the study only considered the firms that are listed in Colombo Stock Exchange (CSE).

7.2 Variables

According to the objective of this study, inventory conversion period, current ratio, operating cycle and cash conversion cycle are used as measures of inventory management (as Independent variable) and the gross profit margin used as a dependent variable to measure the profitability. The following hypothesis are developed based on the dependents and independents variable of this study.

7.3 Hypothesis

The hypothesized variables of inventory management and profitability were identified according to the review of the literatures from past scholarly works and as the reference of inventory management.

H₁: There is a relationship between inventory management practices and gross profit margin of listed companies in beverage food and tobacco sector in Sri Lanka.

H₂: Inventory management has an impact on gross profit margin of listed companies in beverage food and tobacco sector in Sri Lanka

8. Model of the study

The following OLS model has used to analyses the results

$$GPM_{it} = \alpha + \beta_1 (ICP)_{it} + \beta_2 (CR)_{it} + \beta_3 (OC)_{it} + \beta_4 (CCC)_{it} + e_{it}$$

Where:

GPM_{it} = Return on Asset

ICP = Inventory Conversion Period

CR = Current Ratio

OC = Operating cycle

CCC = Cash conversion cycle

α = the Y intercept

e_{it} = error

8.1 Analysis

Analysis was carried out in two methods of descriptive statistics method and inferential statistics method. Mainly data were collected from the audited financial reports, then sorted and analyzed by using a computerized data analysis package known as Stata12. Pearson correlation and regressions were used to measure the relationships and strength between the studied variables.

9. Results and discussions

Table 1 explains the descriptive statistics of the dependent and independent variables used in the study. This critical descriptive statistics examination of the dependent and independent variables discloses several issues.

Table 1: Descriptive statistics of dependent and independent variables (2012– 2016)

Variable	Obs	Mean	Std. Dev.	Minimum	Maximum
ICP	100	63.6043	50.59704	10.12273	295.5786
CR	100	2.948528	5.391127	.1167155	45.65175
OC	100	171.2038	108.8892	54.82003	443.4706
CCC	100	8.72313	228.4558	-1465.523	1536.297
GPM	100	13.84257	15.53195	-1.849498	71.36331

ICP=inventory conversion period, CR=current ratio, OC=operating cycle, CCC= cash conversion cycle, GPM= gross profit margin.

Source: Results obtained from the data analysis using the statistical software package of Stata12.

This critical descriptive statistics examination of the dependent and independent variables discloses several issues. The study indicated that Profitability can be denoted by gross profit margin (GPM).

The mean (average) gross profit margin (GPM) is 13.84% to the whole sample and standard deviation is 15.53. This accounting measure (GPM) is used as profitability measure, which varies from -1.84 to 71.36 with mean ratio of 13.84%, and explains that beverage food and tobacco sector firms have an average accounting performance. The difference in gross profit margin ranged from profitability of 71.36 % (maximum value) to a loss of 1.84% (minimum value). This explores a great disparity among the firms in their profitability.

Among the measures of inventory management, operating cycle has a highest average ratio of 171.2 this means that an average number of days a company takes in realizing its inventories in cash about 171 days in beverage food and tobacco sector companies. Current Ratio (CR) has a lowest average ratio of 2.95 that's means an average short-term solvency position is 2.95 times in beverage food and tobacco sector companies.

Further the other measures of inventory management is inventory conversion period (ICP) and cash conversion Cycle (CCC), they have an average ratio of 63.60 and 8.72 respectively.

Finally, when looking through the standard deviation (SD) measures which is helpful to know the variables' level of variation from their mean value. Here in this study explores that the most volatile variable among the examined variables is cash conversion cycle (CCC) with a S.D of 228.46 followed by operating cycle (OC) with a S.D of 108.89 then inventory conversion period (ICP) with 50.60. Whereas the least volatile (most stable) variable is current ratio (CR) with a S.D of 5.39 followed gross profit margin (GPM) with 15.53.

9.1 Correlation Matrix

The correlation matrix of the independent and dependent variables is presented in Table 2 below. The results reveal that the gross profit margin has a positive relationship with the inventory management measures of inventory conversion period and operating cycle, which are 54.00% and 41.35% respectively and those are significant at 05% level. This is not consistent with the analysis that the lower the number of days the inventory is held in a firm before its turnover, the more the assets are utilized in the firm increasing profitability, whereas a negative relationship with cash conversion cycle, which is -23.84% significant at 05% level (this result strengthens the finding of Takon, (2013) and Lazaridis and Tryfonidis, (2006). In case of other inventory management measure of current ratio has low degree of strength with 06.22% and that is insignificant at 05% level.

So, we can say inventory conversion period and operating cycle have a positive influence with the profitability measures of gross profit margin and cash conversion cycle has negative association with gross profit margin of beverage food and tobacco Companies listed in Colombo stock exchange of Sri Lanka.

This finding reveal that the Sri Lankan listed firms of beverage and food sector companies' gross profit margin express a positive association with inventory conversion period and operating cycle whereas negative association with cash conversion cycle.

It implies that Sri Lankan listed firms of beverage and food sector companies' (they are small compare to firms in developed countries) inventory conversion period and operating cycle have a significant positive influence and cash conversion cycle has a negative significant influence on gross profit margin and the null hypothesis **1** is rejected in-case of inventory conversion period, operating cycle and cash conversion cycle.

This result is consistent with Shin and Soenen (1998); Lyroudi and Lazaridis (2000); Abuzayed (2012); Abuzayed (2012) and Takon (2013).

Table 2: Correlation Matrix of the Variables (2012 -2016) and VIF

	ICP	CR	OC	CCC	ROA	VIF
ICP	1.0000					2.29
CR	0.2798*	1.0000				2.06
OC	0.6319*	-0.1438	1.0000			1.38
CCC	-0.3266*	0.1372	-0.3451*	1.0000		1.21
GPM	0.5400*	0.0622	0.4135*	-0.2384*	1.0000	

Note: ICP = Inventory conversion period; CR = Current ratio; OC = Operating cycle; CCC = cash conversion cycle; GPM = Gross profit margin, * -Significant at 05% level

Source: Results obtained from the data analysis using the statistical software package of StataSE12.

Normally when we are doing the regression analysis, that the statistical problem of multicollinearity issue should considered among the independent variables.

As per the recommendation of Gujarati (2003) Variance inflation factor (VIF) can be used to diagnostics of multicollinearity issues among the explanatory variables. VIF measures express that how much that the estimated regression coefficients variance is inflated due to the correlations among the predictors in the model.

The VIF values among the independent variables of Sri Lankan beverage food and tobacco sector firms are examined and tabulated with Table 2 and its appear that none of the VIF value indicates above value of 3 (cutoff value is 10) this shows that multicollinearity problem does not exist among the explanatory variables used in this study.

9.2 Regression analysis

Regression analysis evaluates the relationship and its strength between dependent and independent variables. Regression analysis performed and given the results below in the Table 3.

Table 3: Effect of inventory management measures on Gross profit margin

GPM	Coefficient	SE	t-statistic	Prob.
ICP	.1511052	.0396955	3.81	0.000
CR	-.167911	.2898053	-0.58	0.564
OC	.0113468	.0175169	0.65	0.519
CCC	-.0028653	.0063844	-0.45	0.655

Constant	2.80911	2.779692	1.01	0.315
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Note: $R^2 = 0.3051$; Adjusted $R^2 = 0.2758$; $F(4, 95) = 10.43$; $\text{Prob} > F = 0.0000$

GPM = Gross profit margin; ICP = Inventory conversion period; OC = operating cycle; CR = current ratio; CCC = cash conversion cycle.

Source: Results obtained from the data analysis using the statistical software package of StataSE12.

As per the results on Table 3, model has a R^2 value of 0.3051 that indicates the explanatory power of the dependent variables to the independent variables. It means 30.51% of the variation in gross profit margin of the beverage food and tobacco sector companies is explained through the selected independent variables; inventory management which is represent the inventory conversion period, current ratio, operating cycle and cash conversion cycle; whereas 69.49% is explained by other variables outside to this model.

The adjusted R^2 represent when another one variable is added to the model, how far it will explain the dependent variable. Adjusted R^2 is 0.2758 in this model and when added to new variable in this model, it will explain 27.58% of the gross profit margin of the companies. This indicated that our model is a predictor, which indicates that there is a positive relationship between the dependent variable (GPM) and the independent variable which is used in this model.

According to these observations of dependent variable, model values concludes that, this is a statistically good fitted model. Because to this model's F value is 0.0000 which indicates that model is significant at 5% confidence level. So the null hypothesis 2 is rejected.

$$\text{GPM} = 2.8 + 0.1511 \text{ ICP} - 0.167 \text{ CR} - 0.011 \text{ OC} - 0.002 \text{ CCC}$$

10. Conclusions

A notable dissimilarity between the inventory management influences on profitability measure of Sri Lankan firms and developed countries' firms is that, Sri Lankan firms most probably inventory conversion period have considerable positive influence on its gross profit margin. This situation exposes that, in the Sri Lankan firm's inventory conversion period is higher.

According to the findings of operating cycle, Sri Lankan firms' operating cycle has a positive influence on gross profit margin. Further this exposes that, in the Sri Lankan firm's operating cycle's effect is considerable lower and insignificant.

Whereas findings of current ratio and cash conversion cycle have a negative influence on gross profit margin. This situation also exposes that, in the Sri Lankan firm's cash conversion cycle is considerable lower, and both of them influence on gross profit margin is insignificant.

The findings of this empirical research study propose that a number of insights from western developed theories can be convenient to Sri Lanka, further that the certain firm's specific factors which are relevant for describing inventory management and firm's profitability in Western countries are also relevance to Sri Lanka.

11. Recommendations

Corresponding to the findings of this empirical study, the following appropriate recommendations are stated as;

Sri Lankan beverage food and tobacco sector listed firms should try to have high inventory conversion period and high operating cycle, those can be help to make more profit (GPM). Sri Lankan beverage food and tobacco sector listed firms should try to have low degree of cash conversion cycle and current ratio; those can be help to make more profit (GPM).

12. Contribution to knowledge

This research study contributes to the existing literature through examining the inventory management measures which influence on gross profit margin of Sri Lankan beverage food and tobacco sector listed firms from the view of that firm's inventory management mea-

asures. This study helps to understand the impact of inventory management measures with Sri Lankan beverage food and tobacco sector gross profit margin and how they affect their performance. This study findings can be helpful to board of directors and finance managers of Sri Lankan beverage food and tobacco sector firms as an output of this research study can serve as a useful database and resource material in the area of inventory management and profitability related decision makings.

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