RELATIONSHIP BETWEEN SUPPLY CHAIN PLANNING AND STOCK LEVELS IN SUPERMARKETS IN KENYA: A CASE OF TUSKER MATTRESSES LIMITED

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ABSTRACT

The study sought to expound on the effects of supply chain planning on optimal stock levels in Tusker Mattresses supermarkets in Kenya. Stock levels are an important part of supply chain management. It directly impacts on the firms’ profitability, as it represents a big portion of the current assets and working capital of the retail stores. Supply chain planning aims at taking appropriate decisions and actions that enables availing of desired goods in a cost effective way, to meet and surpass customer requirements. There is little empirical evidence in the Kenyan context to establish such a relationship hence the need of the study. The main objective of this study was therefore to examine the role of supply chain planning on determination of optimum stock levels in retail stores. The key questions this sort to investigate was the influence of supply chain planning on optimal stock levels. And also establish which supply chain planning strategies can be adopted to achieve optimum stock levels in retail stores. The Resource-Based View Theory (RBVT), Transaction Cost Economics Theory (TCET), Social Network Theory (SNT) and The Assimilation Contrast Theories was used to guide the research process. To achieve the study objective and answer the research questions. The study adopted a descriptive and correlation research design. A survey was undertaken targeting staff of Tuskys Mattresses Ltd. A sample of 66 staff out of 188 total staff establishment who includes the managers and supply chain officers from 52 outlets in Kenya participated. Questionnaires were used as the main data collection instruments for primary data, and it was administered online. Secondary data from the supermarket was analyzed and recorded. Data collected was analyzed using SPSS. This generated frequency tables took into account the relationship between the various supply
planning components and optimal stock levels. A multiple regressions was performed to determine all the relationship between dependent and independent variables. The study establishes there is a relationship between supply chain planning factors and optimum stock levels in retail stores. However, only a third of the variation on stock level in Tuskys supermarket stores can be attributed to demand planning and forecasting, supply network planning, vendor managed inventory and logistic planning; whereas two thirds of the variation on stock levels is affected by other variables not studied.

**Key words:** Demand Planning & Forecasting, Supply Network Planning, Vendor managed inventory, Logistics Planning, Stock Levels

**Background to the study**
The supply chain includes not only the retailers and suppliers, but also manufacturers, transporters, warehouses, and even customers themselves. Supply chain planning is therefore important concept and aspect of supply chain management in meeting customers’ demand. It consists of demand planning and forecasting, vendor managed inventory, supply network and logistics planning (Sunil & Peter, 2013). In essence, good supply chain planning ensures a smooth running of a retail business with few on no cases of excess stocks or stock outs, shrinkages and bullwhip stocks. Some of the adverse effects of unstable stock levels, is that when stocks are in excess of demand, collected revenues are inadequate to settle supplier obligations resulting to negative working capital. Goods with short expiry dates get obsolete. Handling becomes cumbersome resulting to damaged goods. It becomes impossible for suppliers to subsequently make supplies if bills are not settled. On the other hand during stock outs, the business loses customers who extend to other complementary products as well. In addition, inefficient supply chain and or poor inventory management results in unstable prices of commodities due to mismatch of demand and supply.

Supply chain planning in retail stores is not only important on availability of products, but also in determining the right level of products available. Level of product available is the fraction of demand that is served on time from product held in stocks. A high level of product available provides a high level of responsiveness however increases cost because much stock is held but rarely used. In contrast, a low level of product availability lowers inventory holding cost but results in a higher fraction of customers who are not served on time. The basic trade-off when determining the level of product availability is between the cost of inventory to increase product availability and the loss from not serving customers on time as advanced by, Sunil & Peter (2013) and Michael (2011).
Literature Review

Theoretical Review

Several theories and models have been put forward by scholars to explain the field of supply chain management. These theories have their roots in other fields other than procurement and supply chain management, whoever are useful in guiding and understanding the study phenomena in details. In this study four theories namely, resource – based view theory, transaction Cost economics, social network theory, and the expectancy disconfirmation theory guided the study.

Resource-based view theory (RBVT)

RBV is an approach to achieving competitive advantage that emerged in 1980s and 1990s, after the major works published by Wernerfelt, B. (“The Resource-Based View of the Firm”), Prahalad and Hamel (“The Core Competence of The Corporation”), Barney, J. (“Firm resources and sustained competitive advantage”) and others. The supporters of this view argue that organizations should look inside the company to find the sources of competitive advantage instead of looking at competitive environment for it as established by, Zeinab et.el (2013) and Barney (1991).

The resource-based view theory states that a basis for the competitive advantage of a firm lies primarily in the application of a bundle of valuable tangible (physical things such as land, buildings, machinery, equipment and capital). These resources can easily be bought in the market so they confer little advantage to the companies in the long run because rivals can soon acquire the identical assets, or intangible (everything else that has no physical presence but can still be owned by the company, such as brand reputation, trademarks and intellectual property) resources at the firm's disposal.

Transaction Cost Economics Theory (TCET)

The main question that Transaction Cost Economics (TCET) answers is why firms exist? In supply chain management (SCM) context, the theory aims to reduce the costs associated with carrying out a transaction when deciding whether to make-or-buy. There are three attributes which influence a firm's decision to make or buy: frequency of transaction, asset specificity and degree of uncertainty associated with a transaction. In general TCET theory argues that different control and governance mechanisms should be employed to mitigate the risk of opportunistic behavior of supply chain firms when outsourcing. The concept of transaction-cost first appeared in Coase (1937) who created the basis of what became transaction-cost economics (TCET) theory. However, the concept was not elaborated until Williamson (1975 and 1979) who used the term ‘transaction-cost economics’ (TCET). The idea of TCET is to reduce the total costs associated with performing transactions through choosing the most economical governance structure; hierarchy or market (Williamson, 1979) as cited by (Ismail, 2014).
Independent Variables

Dependent Variable

Figure 2.1. Conceptual Framework

Research Methodology
Research Design
The study adopted a descriptive and correlation research design since the study sort to gather quantitative data that describes the nature and characteristics of determinants of supply chain planning within the retail stores. The study investigated the relationship that existed between the independent variables which are: demand planning and forecasting, Supply networking planning, vendor managed inventory, Logistics planning, against the dependent variable which was stocks levels in the retail stores.

According to Severna (2003) as cited by Kinoti (2013), descriptive survey research design is the type of design used to obtain information concerning the current status of the phenomena to describe "what exists" with respect to variables or conditions in a situation. Kothari, (2004) further describes descriptive research as including surveys and fact finding enquiries. He argues that the major purpose of descriptive research is to description the state of affairs as it exists at present.

This study considered this design appropriate because it facilitated towards gathering of reliable data describing the true characteristics of determinants of supply chain planning as it relates to stock levels in retail stores. Correlational research design comprises collecting data to determine whether, and to what extent, a relationship exists between two or more quantifiable variables. Correlational research uses numerical data to explore relationships between two or more variables.
**Target Population**
The study population consisted 188 staff of Tusker Mattresses Ltd. This included 56 managers and 132 subordinates.

**Sampling frame**
The company has a vast supply chain network consisting of 52 retail outlets in Kenya. The table below show staff distribution per department and levels of responsibility that informed the sampling frame.

**Study sampling frame**

<table>
<thead>
<tr>
<th>Department</th>
<th>Manager</th>
<th>Subordinate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warehouse</td>
<td>2</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Purchasing</td>
<td>3</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Transport</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Outlets</td>
<td>48</td>
<td>96</td>
<td>144</td>
</tr>
<tr>
<td>Accounts</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>56</strong></td>
<td><strong>132</strong></td>
<td><strong>188</strong></td>
</tr>
</tbody>
</table>

Source: Tusker Mattresses Human Resource Department, 2015

**Sample and Sampling technique**
The study adopted a systematic sampling technique, this is because a complete and up to date list of the staff was available. To draw a systematic sample the following steps was followed. A list of all staff in the study sample was drawn and assigned a number from 1 to 66. The sampling interval, the distance in the list between each enterprise selected for the sample was determined (Sampling interval = Population size 188 ÷ Desired sample 66 = 2.84) the sampling interval used was 3. Sampling ratio (number of the proportion of staff in population that was selected) identified by (K=total population size which was 188 divided by the size of the desired sample n which was 66. K= 66/188 = 0.35. Since there is no 0.35 enterprise, this was rounded up to 1. Random numbers were generated by use of online computer application at http://stattrek.com/Tables/Random.aspx. Start point was identified as explained by (Kothari, 2004), by starting at fourth row, second column and proceed down the column, a systematic pattern was used proceeding through the table, as all the numbers below 500 were picked. A sample by choosing every kth entry was drawn.

The number of staff to be studied (the sample) was arrived at using a simplified Taro Yamane (1967) formula of sampling as used by (Israel, 2016) formula for proportions below:

\[ n = \frac{N}{1+N \cdot (e)^2} \]

Where;
- \( n \) = the sample size,
- \( N \) = the population size and
- \( e \) = the level of precision

A 90% confidence level or 10% precision level, which is appropriate and acceptable for small samples as proposed by Yamane (1967, 1973) was used.

\[ n = \frac{188}{1+188 \cdot (0.1)^2} \]
\[ n = 65.27 = 66 \]
Further, the 66 staff under the study was distributed proportionally to their percentage in each department as indicated in table 5 below.

**Samples distribution per department**

<table>
<thead>
<tr>
<th>DEPARTMENT</th>
<th>Manager</th>
<th>%</th>
<th>Sample</th>
<th>Subordinate</th>
<th>%</th>
<th>Sample</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warehouse</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>18</td>
<td>9.6</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Purchasing</td>
<td>3</td>
<td>1.6</td>
<td>1</td>
<td>10</td>
<td>5.3</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Transport</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>2.1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Outlets</td>
<td>48</td>
<td>25.5</td>
<td>16</td>
<td>96</td>
<td>51.1</td>
<td>33</td>
<td>144</td>
</tr>
<tr>
<td>Accounts</td>
<td>1</td>
<td>0.53</td>
<td>1</td>
<td>4</td>
<td>2.1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>56</strong></td>
<td><strong>19</strong></td>
<td><strong>132</strong></td>
<td><strong>47</strong></td>
<td><strong>188</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Data collection Instruments**

Data collection instrument is a tool used to collect data in an objective and a systematic manner. In this study, the main data collection instruments was questionnaires. This was used to collect primary data. The questionnaire contained both open-ended and closed-ended questions, with the quantitative section of the instrument utilizing both a nominal and a Likert-type scale format. The Likert-type format was selected because according to Rraenkel & Wallen (2006) it yields equal-interval data, a fact that allows for the use of more powerful statistics to test research variables. Questionnaire was preferred in this study, because the information obtained from questionnaires is free from bias and researchers’ influence and thus accurate and valid data according to Kothari (2004).

**Data collection procedure**

Data for the study was collected using questionnaire through online web based application [www.surveymonkey.com](http://www.surveymonkey.com). Online data application was used as all the staff at Tuskys have access to office e-mails. The online data collection procedure was also faster, cheaper, more accurate and easy for participants (SurveyMonkey, 2016).

**Pilot study Results**

The questionnaires was be pre-tested on 5 staffs, (7.5 % of sampled staff) one from, each department. Mugenda & Mugenda (2003) advices a 1 to 10 % of population sample size to be used for pre-testing.

**Research Reliability**

The scores from the respondents after double administration of the instruments was correlated to test reliability (Kothari, 2004). The expected level of reliability should attain a correlation coefficient of 0.7 and above. As normally coefficient 0.00 indicates a complete absence of relationship, hence no reliability at all, whereas 1.00 is the maximum possible coefficient that can be obtained. Therefore, 0.7 was considered sufficient to confirm and reflect consistency of the instrument (Rraenkel & Wallen, 2006).

**Research Validity**

A measure of validity was guaranteed by discussion of the research instrument with peers and the research supervisor.
Data Analysis and Presentations
The study generated quantitative data, therefore descriptive statistics data analysis method was used to analyze numerical data gathered. Descriptive statistics helped to compute measures of central tendencies and measures of variability in order to determine how independent variables affected the dependent variable (Cooper & Schindler, 2003). The (SPSS) computer software was used for analysis of the study variables. SPSS has descriptive statistics features assisted in variable response comparison and gave a clear indication of response frequencies.

A further inferential statistics was done using correlation and regression analysis. Multiple Linear regression model was used to establish the significance of the independent variables on the dependent variable. Pearson correlation was used to establish the strength of the linear relationship between each of the independent variables and the dependent variable. The study findings is presented using tables, since tables are user friendly, easy to understand and shows response frequencies as well as percentages of the respondents’ opinions on determinants of supply chain planning in retail stores.

The following multiple regression model as shown by equation 2 was used:

\[ Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + \epsilon. \]

Where:
- \( Y \) = Stock levels
- \( X_1 \) = Supply networking
- \( X_2 \) = Vendor Managed Inventory
- \( X_3 \) = Demand planning and forecasting
- \( X_4 \) = Logistics planning
- \( B_0 \) = Constant of Regression
- \( \epsilon \) = Error Term

Results
Response Rate
The study adopted a systematic sampling technique, this is because a complete and up to date list of the staff was available, a sample size of 66 staff had been determined and questionnaires e-mailed to them. A total of 34 (51%) sampled staff responded. Barasa (2016), Campion (1993) suggested that authors need to make reasonable efforts to increase questionnaire return rates, address the influence of non-respondents and ensure that they don’t contain any obvious biases.

Mugenda and Mugenda (2008) observed that a 50% response rate is adequate, 60% good and above 70% is rated Very Good. Babbie (2011) averred that return rates of 50% are acceptable to analyze and publish, 60% is good and 70% is very good. Dillman (2000) suggested 50% as the minimal level while Fowler (2009) suggests 60%. Thus, the 73% return rate for this study was considered credible enough to allow generalization of the findings to the target population.

Descriptive Statistics
The purpose of descriptive statistics is to enable the researcher to implicitly describe a distribution of scores or measurements using statistics. The researcher in this study used mean percentages to present the study findings. The main focus of the research was to establish the relationship between supply chain planning and stock levels. The study first sort to establish if the respondents felt supply chain planning assists in maintaining optimum stocks levels,
which 100% of the respondent agrees. An analysis was done to establish how the four independent study variables influence stock levels as explained below.

Stock levels
The study determined current stores stock levels. This was to establish if the optimum stocks levels are maintained. From the study findings, 90.9% of the respondents do experience stock outs in the supermarkets. Further as illustrated in figure 4.3 the frequency of stock outs is experienced on a daily basis. This finding shows that efficient stock control to allow the right amount of stock in the right place at the right time is not adequate. However, the study also established as shown in Figure 4.4 below, majority (48.5%) of the respondents agrees that the stock levels are adequate for customers’ requirements, 30.3% feel that the stocks are inadequate, and 21.2% of the respondents feels that excessive stock is maintained.

Frequency of stocks out

Stock holding levels

Supply Chain Planning
The study sort to establish how demand planning and forecasting influences stock levels. To better understand the supply chain planning process, the respondent were asked if they had laid down policies and manuals for supply chain processes. From the study findings majority
(93.9%) of the staff feels that there are adequate policies, procedures and manuals to support supply chain planning, whereas only 6.1% were not aware.

**Demand planning and forecasting**
The study sought to establish how the demand planning and forecasting factors affect the stock levels. From the study findings, as shown in figure 4.6 below, it is established that demand of the product is the highest factor (66%) influencing demand planning and forecasting, then product characteristics (56%), suppliers (47%) and competition in the market (46%).

**Factors influencing demand planning and forecasting**
This finding is in line with (Andre, Mike, & Jeff, 2016) who argue that planning the retail supply chain starts at store level by understanding of consumer demand. This is because all supply chain management decisions are based on forecasts that define which products will be required, what amount of these products will be called for, and when they will be needed. The demand forecast becomes the basis for companies to plan their internal operations and to cooperate among each other to meet market demand. The finding also signifies the importance of supply, product characteristics and competitive environment in demand planning and forecasting.

**Supply network planning**
The study sought to establish how the supply chain planning which includes the collection of transportation modes, locations, and routes along which product reaches stores affects the stock levels. This is because good supply networking is very important as supply networking enhances stocks levels in supply chain, (Chopra, 2016). From the study findings, the transport mode is the most important factor (59%) of the supply networking planning factors, followed by location of the stores (47%) and the least factor is route used (38%). Therefore, the most effective and efficient transport mode is very important factor in determining the stock levels.
Supply network planning factors.

Vendor managed inventory (VMI)
The study sought to determine if vendor managed inventory plays an important role on the stock levels. From the study findings as summaries in figure 4.8 below, the most important factor of VMI on the stock levels is lead time (64%), and response to the market changes (63%).

Effects of vendor managed inventory on stock levels

Further as shown in figure 4.9 it was established that return of goods process to suppliers assists greatly in optimizing stock levels.

Return of goods to suppliers effect on optimum stock levels.
The study also sort to establish if retailer-supplier relationship influences stocks levels. From the study findings, 96.9% of the respondents thought that it plays an important role on the stock levels. If planned well therefore VMI can benefit retailers by improving lead time, stock cost, enhancing delivery reliability, direct response to market demands, and lowering demand uncertainty.

**Logistics Planning**

The study found it important to establish from the respondent if network planning processes has effect on the stock levels. All the respondents (100%) agrees that logistics planning is very important. As shown in figure 4.10 below, most of the respondents (56%) felt that packing is important, followed by information flow (55%), product handling (54%), warehousing (53%), security of goods (52%) and flow of goods (50%).

![Graph showing factors affecting logistic planning](image)

**Factors effecting logistic planning**

Therefore, from the findings of this study packing services in delivery of supplies determines the efficiency of moving products.

**Inferential Statistics**

Inferential statistics were conducted through the use of correlation analysis to determine the relationship between the independent and the dependent variables. Pearson correlation was used to establish the strength of the linear relationship between each of the independent variables and the dependent variable.

**Correlation Analysis**

The first step was to construct correlation matrix for various possible combinations of dependent and independent variables. The correlation matrix shows that e-procurement has a positive correlation with Financial Performance in the Public Sector. The outcome of this exercise was the understated correlation matrix. Correlation is a term that refers to the strength of a relationship between two variables. A strong or high correlation means that two or more variables have a strong relationship with each other while a weak or low, correlation means that the variables are hardly related. Correlation coefficient can range from -1.00 to +1.00. The value of -1.00 represents a perfect negative correlation while a value of +1.00 represents a perfect positive correlation. The most widely used types of correlation coefficient is the Pearson which
is also referred to as linear or product-moment correlation. This analysis assumes that the two variables being analyzed are measured on at least interval scales as shown in table below

<table>
<thead>
<tr>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Stock Levels</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Demand Planning &amp; Forecasting</td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td>Supply Network Planning</td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Vendor managed inventory</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Logistics Planning</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

*. Correlation is significant at the 0.05 level (2-tailed).

A correlation matrix is a table showing correlation coefficients between sets of variables. Each random variable (Xi) in the table is correlated with each of the other values in the table (Xj). This allows you to see which pairs have the highest correlation (Steiger, 1980).

The study established that there was a positive association between variables as shown; demand planning & forecasting pearson correlation and stock levels were at .948, supply network planning pearson correlation and stock levels were at .948, logistics planning pearson correlation and stock levels were at 340, and vendor managed inventory pearson correlation and stock levels were at 340.
levels were at -.075 negative relationship. This implied that variables with negative significance had a negative influence on logistics planning and_stock levels.

**Overall Model**

Multiple regression analysis was used to determine whether independent variables; demand planning and forecasting ($X_1$), supply network planning ($X_2$), vendor managed inventory ($X_3$), and logistic planning ($X_4$) simultaneously affect the dependent variable ($Y$) which is determinant of stock levels. The model used for the regression analysis was expressed in the general form as given:

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + \epsilon.$$  

Where:  
- $Y$ = Stock levels  
- $X_1$ = Supply networking  
- $X_2$ = Vendor Managed Inventory  
- $X_3$ = Demand planning and forecasting  
- $X_4$ = Logistics planning  
- $B_0$ = Constant of Regression  
- $\epsilon$ = Error Term

**Regression Model Summary**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.94a</td>
<td>.864</td>
<td>.753</td>
<td>136563</td>
</tr>
</tbody>
</table>

Predictors:  
(Constant), Demand planning and forecasting, Supply network planning, VMI, and Logistic planning

For this model, stock levels was used as the dependent variable ($Y$) and independent variables included $X_1$, $X_2$, $X_3$, and $X_4$. The relationships between the dependent variable and independent variables, and the results of testing significance of the model were also respectively interpreted. In interpreting the results of multiple regression analysis, the major elements considered were: the coefficient of multiple determinations, the standard error of estimate and the regression coefficients (Green & Salkind, 2010). Table above reports the model of implementation of stock levels with the coefficient of determination $R^2 = .864$ and $R = 0.94$ at 0.05 significant level. The coefficient of determination indicates that 86.4% of the variation on stock level in Tuskys supermarket stores can be explained by demand planning and forecasting ($X_1$), supply network planning ($X_2$), vendor managed inventory ($X_3$), and logistic planning ($X_4$). The remaining 13.6% of the variation on stock levels is affected by other variables not included in the model (Greene, 2012).
Analysis of Variance (ANOVA)
The ANOVA table indicates that the model used is significant as compared to the null model. The ANOVA table indicates that the model used is significant. This implies we reject the null hypothesis which states that the regression coefficients are all equal to zero. It is a collection of statistic model used to analyze the differences among group means and their associate procedures such as variation among group & between groups. The results of Analysis of variance (ANOVA) for regression coefficients are shown in Table below

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>14.675</td>
<td>4</td>
<td>3.669</td>
<td>73.737</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>1.443</td>
<td>29</td>
<td>.050</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16.118</td>
<td>33</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Stock Levels
b. Predictors: (Constant), Logistics Planning, Vendor managed inventory, Demand Planning & Forecasting, Supply Network Planning

Analysis of variance (ANOVA) is a collection of statistical models used to analyze the differences among group means and their associated procedures (such as variation among and between groups), developed by statistician and evolutionary biologist Ronald Fisher (Anova, 2002). The results of Analysis of Variance (ANOVA) for regression coefficients in table 4.10 reveals that the significance of the F statistics is 0.000 which is smaller than 0.05 and the value of F (73.737) being significant at 0.05 confidence level. The value of F is large enough to conclude that the set coefficients of the independent variables are not jointly equal to zero. This implies that at least some of the independent variables has an effect on the dependent variable.

Regression Coefficients
Regression analysis was utilized to measure the relationship between the variables. These included an error term, whereby the dependent variable was expressed with a combination of independent variables (Cameron, & Windmeijer, 1996). The unknown parameters in the model were estimated, using observed values of the dependent and independent variables as shown in the table below
## Regression Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>1.696</td>
<td>.298</td>
</tr>
<tr>
<td>Demand Planning &amp; Forecasting</td>
<td>.579</td>
<td>.037</td>
</tr>
<tr>
<td>Supply Network Planning</td>
<td>.028</td>
<td>.039</td>
</tr>
<tr>
<td>Vendor managed inventory</td>
<td>.024</td>
<td>.032</td>
</tr>
<tr>
<td>Logistics Planning</td>
<td>.033</td>
<td>.061</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Stock Levels

The Regression Coefficient is the constant ‘b’ in the regression equation that tells about the change in the value of dependent variable corresponding to the unit change in the independent variable (Bates, Maechler, Bolker, & Walker, 2014).

The Interpretation of the ordinary regression model - the most popular technique for making predictions of a single continuous variable - focuses on the model's coefficients with the aid of three concepts: the statistical p-value, variables held constant, and the standardized regression coefficient (Paternoster, Brame, Mazerolle, & Piquero, 1998).

The findings indicated that Demand Planning & Forecasting had a p-value of 0.000 which was significant at the 5% significant level. This indicated that there was a relationship between Demand Planning & Forecasting and Stock Levels. The study established that Supply Network Planning had a p-value of 0.477 which was not significant at the 5% significant level. This indicated that there was a relationship between Supply Network Planning and Stock Levels. The study established that Vendor managed inventory had a p-value of 0.466 which was not significant at the 5% significant level. This indicated that there was a relationship between Vendor managed inventory and Stock Levels. The study established that Logistics Planning had a p-value of 0.592 which was not significant at the 5% significant level. This indicated that there was a relationship between Logistics Planning and Stock Levels.

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e \]

\[ Y = 1.696 + .579X_1 + .028X_2 + .024 X_3 + .033X_4 \]

### Conclusion

The study concluded that that supply network planning affects optimum stock levels at Tuskys stores. Also the study concluded that that demand planning and forecasting affects optimum stock levels at Tuskys stores positively.

The study concludes that the major supply chain planning factors affecting stock levels includes; products demand and forecasting, choosing the right mode of transportation of goods,
good vendor relationship, appropriate packing of products, good information flow, products handling as well as sufficient warehousing facilities. It is noted that Tuskys have policies and procedures guiding supply chain planning, however there is low level of experience and lack of professional training in supply chain management which need to be enhanced. In overall, supply chain planning was found to be collectively significantly influencing optimization of supermarket inventory levels. The study provides substantive support for previous findings in supply chain planning and logistics management literature and fresh insight about planning and inventory in supermarkets. Subsequently, the study has a basis to conclude that, collectively, supply chain planning influence the stock holding levels of supermarkets in Kenya.

**Recommendations**

The study sought to examine the relationship between supply chain planning and stock levels in supermarkets in Kenya and specifically focusing on Tusker mattresses limited which is one of the leading local supermarkets.

**Demand Planning & Forecasting**

The recommend that demand planning and forecasting affects optimum stock levels at Tuskys stores. The study established that demand of the product is the high and it influences on stock levels at Tuskys stores. Supermarkets in Kenya should practice high supply chain planning techniques at all the functions of supply chain management that will contribute significantly in improving stock holding levels and in return offer best customer product availability. The retailers should invest in constructing information databases to be used in demand planning. Such information should be able to anticipate supply, demand and product competitiveness trends. Management should ensure adequate skills are available to put in place proper and workable supply networking plans after having considered available modes of transport, stores location and available routes.

**Supply Network Planning**

The study established that supply network planning affects optimum stock levels at Tuskys stores. The study recommended that supply network planning is key and important in supermarket and it influences the stock levels. The study found out that stock levels is directly affected by supply chain planning. To improve on stock levels and mitigate stock outs currently experienced, it is recommended to enhance strategies and actions on products demands and forecasting, notable knowing what products are on demand. It is also important to strengthen transport mode of products to the supermarket. The management should also enhance vendor relationship. The supermarket should also invest in packaging handling facilities as well warehouse facilities so as to improve on moving load, delivery speed, service quality, operation costs and the usage of facilities. Further it is also recommended for the management to consider development of staff professional training by supporting staff to train in supply chain management course.

**Vendor managed inventory**

The study established that vendor managed inventory affects optimum stock levels at Tuskys stores. The study recommended that vendor managed inventory influences the stock levels at Tuskys stores positively. Involvement of suppliers in joint vendor inventory management planning, involving them in product availability and having clear policy on managing the relationship should be given high importance for sustainable stock levels in the supermarkets.
Policies should be put in place to strengthen relationships and product ownership between manufacturers and retailer. This should be anchored in the fact that retailers are middlemen between producers and consumers. Consumers should be given an avenue to interact with the producers in the retail locations setup by the supermarkets. In return such policies would become good avenues for vendor managed inventory retail concepts.

**Logistics Planning**

The study recommend that logistics planning affects optimum stock levels at Tuskys stores. For an effective supply chain network, the company should standardize means of communication by creating environment that improves effective information and resource sharing among panning departments. This can only be easily achieved by use of technological systems that would prompt through dashboards and communication prompts. The study recommended that transportation network (system) should be well managed to reduce challenges and demand uncertainty. The study also recommended that appropriate transportation mode is necessary to ensure good flow of goods is good from warehouse to consumers.

**Areas for Further Research**

The variables collectively show that 86.4% is variation in the supply chain planning and stock levels in supermarkets in Kenya and specifically focusing on Tusker mattresses limited which is one of the leading local supermarkets and 13.6% attributed to other factors that influencing stock levels in supermarkets in Kenya. This study was confined to one chain store where as there are many players in the market. The study also was focused on four major supply chain planning factors. This limited the study from exploring other factors that still could affect sock levels in the stores. The study, therefore, proposes further studies to be carried out to help in establishing other factors that are likely to affect stock levels in the stores. The specific areas of future studies could include corporate social responsibility, the level of procurement regulations enforcement etc. Further studies should also be carried out in other supermarkets as they may have unique challenges.

**References**


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