Full Length Research Paper

Effectiveness of vendor managed inventory systems in retail supermarkets in Kenya

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Abstract
Every business exists to make profit. In the 21st century, these profits are realized in a myriad of ways including cost savings, improvement of working capital and reduction of risk. This paper sought to find out the contribution of adoption of Vendor Managed Inventories, also known as Consignment Stock Management, as a strategy that shrewd business executives in the retail supermarket chains could use to gain competitive advantage by leveraging on inventory supplier reliability, lower administrative costs, and strong buyer/supplier relationships to grow revenues and reduce risk. Data from procurement managers in 24 retail supermarkets with a branch network of more than three in Nairobi was analyzed. The findings suggest that VMI has been effective in retail supermarkets by improving stock management, cash flows and risk management. VMI seeks to accomplish a deeper integration and collaboration between the members of the supply chains in order to cope with the ever decreasing time window for product and service fulfillment and the requirements for the improvement of operational efficiency.

Keywords: Vendor Managed Inventories, Consignment Stock Management, supply chain, supermarkets.

JEL Classification: E21

1.0 Introduction

1.1 Background
Vendor Managed Inventory (VMI) is one of the many initiatives that strive towards closer cooperation between the members of supply chains in the area of inventory and demand management (Daughtery, 1999). Vendor Managed Inventory is an inventory management process that falls under the ‘push’ stock management processes. These are processes that are triggered by interpretation of an expected demand in inventory and supply is scheduled to meet this demand. Vendor Managed Inventory/Consignment Stock is inventory that is in the possession of the buyer (shop, warehouse or store), but is still owned by the supplier. Payment of the inventory is made once it is sold. Accordingly, the capital investment on the stock comes from the supplier and the buyer provides space for it (Kumar & Kumar, 2003).

The VMI initiative has the goal of accomplishing deeper integration and collaboration between the members of the supply chain in order to cope with the ever decreasing time windows for product and service fulfillment, and the requirements for the improvement of operational efficiency. Benefits cited as a result of adoption of VMI systems include lowered inventory levels, faster inventory turns, reduced ordering and administrative costs, better cash flow management, zero obsolescence, increased sales, and reduced out-of-stock costs among others (Angulo, A., Nachtmann, H., Waller, and M.A. 2004).

Subsequently, if a company’s Procurement & Logistics Department is successful in its balance between supplies and cost effectiveness, the company has better chances of surviving the current economic environment. This can be best illustrated in retail chain firms that have to deal with multiple suppliers and large volumes of inventory. On this backdrop this study sought to evaluate the effectiveness of Vendor Managed Inventory systems in retail supermarkets in Kenya.

1.2. Concept of Vendor Managed Inventory
VMI has been described as an inventory and supply chain management tool in which the supplier has taken the responsibility for making decisions on the timing and amounts of inventory replenishment. This tool has also been called a continuous replenishment process, continual replenishment or automatic replenishment (Blatherwick, 1998).

The advantages of using VMI to the downstream member, usually a large retailer, have well been documented (Cahon and Fisher, 1997). Waller (1999) noted that the main advantages of VMI were reduced costs, and increased customer service levels to one or both of the participating members. Centinkaya and...
Lee (2000) found that VMI greatly reduced inventory-carrying costs and stock-out problems while, at the same time, it offered the ability to synchronize both inventory and transportation decisions. Fox (1996) noted that VMI’s advantages included improved customer service, reduced demand uncertainty, reduced inventory requirements and reduced cost based on a case study at Johnson and Johnson.

With the reduced stock-outs, suppliers not only saved, but they also received more stock information on the customers’ demand patterns that aided the supplier in planning better on their own inventories. The ability to plan better on inventories and deliveries are often cited as major advantages to the upstream member using VMI (Jain, 1994). Chaouche (2001) developed an analytical model to calculate inventory levels and delivery rates to minimize costs for small suppliers forced to use VMI by larger clients. One important finding of the study was that reducing variability in the amount and timing of the demand increased the benefits of lowered prices. In addition, Blatherwick (1998) noted that VMI was an excellent tool when ordering the policies of the downstream supply chain members were less sophisticated and erratic, or when the distributor was selling to a large number of buyers with erratic buying patterns.

1.2.1. Overview of retail supermarket chains in Nairobi

The growth of supermarkets in Kenya has been attributed to such factors as increased urbanization; a growing middle class and its changing lifestyles; and market liberalisation that has led to increased competition in the sector. The supermarket is not a new concept in Kenya, having had the first store of its kind in the 1960s (Neven, Reardon 2005). Some of the old players in the retail industry are Uchumi Supermarkets, founded in the mid ’70s and Nakumatt Supermarkets, founded in 1987. However much growth was not seen within the retail chains until the mid ’90s when supermarkets grew from 5 to the current over 300 stores in Kenya (Kamau, 2008; Neven and David, 2005). These range from well established retail chains to independent one store supermarkets.

The dominant players in the sector include Nakumatt, which is privately owned with a turnover of over 20 billion Kenya shillings per annum. It is the leading player in the sector with over 19 branches in Kenya as well as regional presence through a branch in Uganda and another in Rwanda. Nakumatt has been noted as a ground breaker in East and Central Africa as it is the first retailer to have its stores open round the clock. Tuskys Supermarkets is another major chain in Kenya, ranking second, by sales, in the retail industry. The oldest and once leading supermarket chain, Uchumi, is also a major player in the industry. Other key retail chains are Ukwala, Chandarana, Eastmatt and Naivas Supermarkets which is amongst the newest players.

1.3. Conceptual framework

A conceptual framework is a research tool intended to assist a researcher in developing an understanding of the situation under investigation. In this study, effective VMI is conceptualised as being dependent on the inventory flow, quality of ICT systems, information quality and sharing and buyer/supplier relationships quality (See Fig1: Conceptual Framework).

1.3.1. Determinants of Effective Vendor Managed Inventory Systems

Armstrong (1997) defines effectiveness as the extent to which actual performance compares with targeted performance. However, Tarrulli (2004) defines VMI effectiveness as the ability of the system to enhance competitive advantages through cost savings, relationships and information quality. Dorling, Scott & Deakins (2005) looked at VMI in oligopolies and its determinants of success. Using literature reviews and case studies, Dorling et al (2006) proposed seven theoretical factors or steps, impacting the success in the food chain oligopoly of New Zealand namely industry structure, rivalry within the industry, buyer’s power, industry profitability, ability to develop long-term relationships, supply chain technology and adoption of Supply Chain Management best practices.

In a VMI partnership, the supplier, usually the manufacturer but sometimes a reseller or distributor, makes the main inventory replenishment decisions for the consuming organisation. This means that the vendor monitors buyers inventory levels (physically or via electronic messaging) and makes periodic re-supply decisions regarding order quantities, shipping and timing. Transactions that are customarily initiated by the buyer, such as purchase orders, are initiated by the supplier. Indeed the purchase order acknowledgement from the vendor may be the first indication that a transaction is taking place; an advance shipping notice informs the buyer of materials in transit. In this relationship, buyers relinquish control of key re-supply decisions and sometimes even transfer financial responsibility for the inventory to the supplier (Waller, Johnson and Davis, 1999).

2.0 Research Methodology

The study adopted a descriptive research design to collect, measure, classify, analyse and interpret data. The data was obtained through a questionnaire. The research instrument was analyzed by use of descriptive statistics as well as inferential statistics. To test the relationships that presuppose a relationship between criterion and response variables, the data coded was extracted using factor analysis methods. The Pearson Correlation Coefficient is a bi-variate correlation coefficient that in this study was used to indicate one-on-one association between each of the independent variables to the dependent variable, while holding other factors constant.

2.1. Sample

The target population was all the retail stores in Kenya. However, the population of study was limited to retail supermarket stores with three or more branches operating and headquartered in Nairobi. Thus the sample was 24 retail supermarket chains. The subjects of the study was limited to the procurement managers working in the various retail stores, as the study was based on the assumption that these are the officers with past and present knowledge of the VMI systems and would thus best placed to offer valuable information to the study.

3.0 Findings, Discussion and Conclusion

3.1. Reliability Results

Reliability of the scale for the constructs describing the variables of the study was found to be sufficient because all the items and composite reliability coefficients were equal to or
The research also established that for an effective VMI, the supermarket systems were compatible with those of the customer service through product availability. This in turn reduces the buffer costs, carrying costs, stock out costs, and s high level of customer service through product availability.

3.3. Effectiveness of VMI System through Quality of ICT Systems
The research also established that for an effective VMI, the supermarket systems were compatible with those of the suppliers, and information was readily available, up to date and easy to use. Generally, the ICT systems among the majority of the respondents enhanced effective VMI systems. VMI has a strong and positive association to the quality of ICT (r= 0.489) and the relationship is statistically significant at 5% level (p= 0.035 < 0.05).

Many studies have found out that VMI is information intensive and requires effective data base linkages among the supply chain partners to facilitate information flow. Investment in technical capability and technological know-how is essential to attract and maintain business with the right partner. Han (1997) suggests that the most promising relationships are where the two partners use a similar technology.

The implications are that ICT infrastructure is critical for the success of VMI. This is because ICT serves several purposes including the decision support framework, the conduit for real-time and timely information sharing in the chain, data storage, retrieval, and communication, and is also a transaction channel. The support of ICT on VMI is paramount.

3.4. Effectiveness of VMI Based On Information Quality and Sharing
The study found that that all (100%) of the supermarkets’ respondents agreed that information quality and sharing affect VMI effectiveness. They indicated that under VMI they make inventory data available to the suppliers, make usage/sales data available to suppliers, and offer reliable information to suppliers that are adequate, timely and complete. In addition, VMI was found to have a strong and positive association to the information quality and sharing (r= 0.522) and that the relationship is statistically significant at 5% level (p= 0.036 < 0.05), (Davis, 2003).

The positive influence of quality information support findings of other scholars such as Garvineni (1999), Simchi-levi & Zhao (2003) and Zhang & Zhang (2007) who indicated that information sharing yields significant performance improvements for the supply chain. The danger therefore lies in poor sharing of information, which according to Kumar & Kumar (2007), if not well shared between the retailer and supplier would have severe impact on the overall success of the VMI. Angulo (2004) added that performance of VMI substantially decreases if the shared information is not up-to-date.

3.5. Effectiveness of VMI System through Relationship Quality
The study found that the relationship quality is important for effective VMI in retail supermarkets. For example, those utilizing VMI were satisfied with the supplier’s performance, and in general they were satisfied with their suppliers. In addition, they indicated that as a result of VMI, they could count on reliable suppliers and were convinced that such suppliers would live up to their deals and agreements (trust and reliability). The study also found that there was mutual trust among the majority of the respondents and their suppliers. However, VMI has a weak but positive association to relationship quality (r= 0.082).

Spekman (1998) and Hines (2000) studied this in detail and observed that a good relationship between the buyer and the
supplier improves supply chain performance. However, they found out that implementing such a relationship is a challenge and requires trust, commitment, and resources and capabilities that are not always possible to allocate to a specific supply chain relationship. The implications are that quality relations may affect the success and performance of the VMI and across the supply chain. The quality of relations is affected by lack of mutual trust, dishonesty and lack of commitment among the partners in the VMI system.

3.6. Key Disadvantages of VMI
Some of the disadvantages of VMI cited by the respondents include: interference with customer satisfactions as some goods on consignment are one-offs; high turnover with suppliers hence difficulties of implementation; and new suppliers may take time to develop credibility in their respective area of supply. This is as observed by Chaouch (2001) while developing an analytical model to calculate inventory levels and delivery rates to minimize costs for small suppliers forced to use VMI by larger customers.

3.7. Conclusion and Recommendations
On implementation, the study concludes that VMI is a recent phenomenon in the retail supermarkets in Kenya having started in 2002 and steadfastly growing. The effectiveness of VMI in the retail supermarkets has been registered in improved stock management, cash flows, risk management, and management of the bullwhip effects associated with unpredictable swings in demand. While VMI has been voted best by the retail supermarket managers, it has its shortcomings associated with trust, turnover of suppliers and small scale suppliers who lack financial capacity to implement VMI concepts sustainably. Sometimes this interferes with customer satisfaction as some goods on VMI become one-offs due to the high turnover of suppliers because some new suppliers are yet to develop credibility in their respective area of supply.

The study also concludes that VMI effectiveness as a system is affected by inventory flow, the quality of ICT and quality of information and sharing but is not affected by the quality of relationship. This indicates that relationship among VMI partners is developed on the basis of implementing the system based on trust and reliability. However, the quality of ICT is most important to facilitate sharing of information among the VMI partners in the supply chain (Fisher, 1997).

Finally, VMI as a system is suitable for large and medium size supermarkets which have well established networks systems and the capability to effectively run the system. Very small partners/suppliers may not afford to have a large warehouse, or afford to lease a large warehouse for an effective VMI. Secondly, a supermarket that is too small owing to its low buying power would lack capacity to support demand for goods that VMI warehousing requires (Damanpour, 1992).

The study makes the following recommendations based on the findings and conclusions: first, the supermarkets intending to partner in VMI should focus on developing strong ICT systems, strong warehousing facilities (either by lease or build) and/or by engaging large suppliers to lease from third parties. This would hasten the implementation of VMI in retail supermarkets.

Also, the retail supermarkets should enter into VMI agreements defining clearly the responsibilities and obligations of the parties involved. This would ensure a smooth flow of not only information sharing but also in the execution the VMI responsibilities as defined in the agreement to avoid mistrust and eventual fall out.

In addition, VMI implementation can be phased with few established suppliers and with few non-shelf life goods. This would ensure reduced conflict with partners, and also allow employees to adjust to the new level of business. Lastly, the retail supermarket should first implement an inventory policy that defines the optimal stock levels which is based on demand forecasts and actual usage/sales. This would ensure that VMI would minimize the impact of the bullwhip effects, (Chopra & Meindl, 2007).

References


Neven, D. and Reardon, T., 2005. The rise of Kenyan supermarkets and the evolution of their fresh fruits and vegetables procurement systems. *Staff Paper 2005-03*, Department of Agricultural Economics, Michigan State University.


### Appendices

**Fig 1: Conceptual Framework**

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Inventory Flow

Quality of ICT Systems

Information Quality and Sharing

Relationships Quality

Effective Vendor Managed Inventory System

Dependent Variable
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<tr>
<th>Variable</th>
<th>Cronbach alpha</th>
<th>No. of items</th>
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<tr>
<td>Inventory flow</td>
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<td>6</td>
</tr>
<tr>
<td>Quality of ICT</td>
<td>.628</td>
<td>6</td>
</tr>
<tr>
<td>Information quality and sharing</td>
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<td>9</td>
</tr>
<tr>
<td>Relationship quality</td>
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<td>6</td>
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<tr>
<td>Overall</td>
<td>8.35</td>
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