

VENDOR MANAGEMENT INVENTORY AT RETAIL CHAIN STORES

01

Mohammad Danish Ali

Abstract

The context of this study is to analyze the Vendor Management Inventory at Retail Chain Stores. I have focused the retail giants in Karachi for the purpose of my research. Retail Chains all over the world are focusing on Vendor management inventory. In VMI concept the vendor monitors the buyer's inventory levels (physically or via electronic messaging) and makes periodic re-supply decisions regarding order supply, shipping and timings.

Vendor management inventory gives number of benefits to the retail chains which includes reduce cost and space, save time, less inventory, less investment, improved cash flow, less risk of fire, accidents and theft and relationship with supplier while enjoying the win-win situation.

The two hypothesis were used which are: Vendor management inventory success in retail chain is independent of obsolescence processes. Vendor managed inventory success in retail chain is independent on inefficient capacity utilization. The method for this research is questionnaire which I distributed in the retail chains to get the answers of my respondents. The sample size was 140 employees. After the collection of data all the data transferred to SPSS to analyze it. According to Crosstab analysis, results was mostly moderate-strong relationship among 2 hypothesis in 4 retail chains which shows that all variables are mostly dependent among each other and have moderate-to-strong relationship.

Chapter: 01

THE PROBLEM

1.1 Introduction

The term supply chain management was first coined by a U.S. industry consultant in the early 1980s. However, the concept of a supply chain in management was of great importance long before, in the early 20th century, especially with the creation of the assembly line. The characteristics of this era of supply chain management include the need for large-scale changes, re-engineering, downsizing driven by cost reduction programs, and widespread attention to the Japanese practice of management.

This era of supply chain management studies was highlighted with the development of Electronic Data Interchange (EDI) systems in the 1960s and developed through the 1990s by the introduction of Enterprise Resource Planning (ERP) systems. This era has continued to develop into the 21st century with the expansion of internet-based collaborative systems. This era of supply chain evolution is characterized by both increasing value-adding and cost reductions through integration.

In fact a supply chain can be classified as a Stage 1, 2 or 3 networks. In stage 1 type supply chain, various systems such as Make, Storage, Distribution, Material control, etc are not linked and are independent of each other. In a stage 2 supply chain, these are integrated under one plan and are ERP enabled. A stage 3 supply chain is one in which vertical integration with the suppliers in upstream direction and customers in downstream direction are achieved.

The third movement of supply chain management development, the globalization era, can be characterized by the attention given to global systems of supplier relationships and the expansion of supply chains over national boundaries and into other continents. Although the use of global sources in the supply chain of organizations can be traced back several decades (e.g., in the oil industry), it was not until the late 1980s that

a considerable number of organizations started to integrate global sources into their core business. This era is characterized by the globalization of supply chain management in organizations with the goal of increasing their competitive advantage, value-adding, and reducing costs through global sourcing. In the 1990s, industries began to focus on "core competencies" and adopted a specialization model. Companies abandoned vertical integration, sold off non-core operations, and outsourced those functions to other companies. This changed management requirements by extending the supply chain well beyond company walls and distributing management across specialized supply chain partnerships.

This transition also re-focused the fundamental perspectives of each respective organization. OEMs became brand owners that needed deep visibility into their supply base. They had to control the entire supply chain from above instead of from within. Contract manufacturers had to manage bills of material with different part numbering schemes from multiple OEMs and support customer requests for work-in-process visibility and vendor-managed inventory (VMI). Specialization within the supply chain began in the 1980s with the inception of transportation brokerages, warehouse management, and non-asset-based carriers and has matured beyond transportation and logistics into aspects of supply planning, collaboration, execution and performance management.

At any given moment, market forces could demand changes from suppliers, logistics providers, locations and customers, and from any number of these specialized participants as components of supply chain networks. This variability has significant effects on the supply chain infrastructure, from the foundation layers of establishing and managing the electronic communication between the trading partners to more complex requirements including the configuration of the processes and work flows that are essential to the

management of the network itself.

Supply chain specialization enables companies to improve their overall competencies in the same way that outsourced manufacturing and distribution has done; it allows them to focus on their core competencies and assemble networks of specific, best-in-class partners to contribute to the overall value chain itself, thereby increasing overall performance and efficiency.

Outsourced technology hosting for supply chain solutions debuted in the late 1990s and has taken root primarily in transportation and collaboration categories. This has progressed from the Application Service Provider (ASP) model from approximately 1998 through 2003 to the On-Demand model from approximately 2003-2006 to the Software as a Service (SaaS) model currently in focus today.

Building on globalization and specialization, the term SCM 2.0 has been coined to describe both the changes within the supply chain itself as well as the evolution of the processes, methods and tools that manage it in this new "era".

It is the pathway to SCM results, a combination of the processes, methodologies, tools and delivery options to guide companies to their results quickly as the complexity and speed of the supply chain increase due to the effects of global competition, rapid price fluctuations, surging oil prices, short product life cycles, expanded specialization, near-/far- and off-shoring, and talent scarcity.

Success in supply chain management usually derives from understanding and managing the relationship between inventory cost and the customer service level. The most attractive projects yield improvements along both dimensions, and this is certainly the case with VMI. To begin, we examine how each partner in a VMI relationship reduces cost and improves service.

1.1.1. Reduced Cost

Demand volatility is the key problem facing most

supply chains, eroding both customer service and product revenues. In traditional retail situations, sales fluctuations are made worse by management policies. Ordering patterns may be aggravated by demand uncertainties in general, conflicting performance measures, planning calendars used by buyers, buyers acting in isolation, and product shortages that cause order fluctuation.

Many suppliers are attracted to VMI because it mitigates uncertainty of demand. Infrequent large orders from consuming organizations force manufactures to maintain surplus capacity or excess finished goods inventory, which are very expensive solutions, to ensure responsive customer service. VMI helps dampen the peaks and valleys of production, allowing smaller buffers of capacity and inventory.

Buyers are attracted because VMI resolves the dilemma of conflicting performance measures. End-of-month inventory level for example, is a key performance measure for retail buyers, but customer service level (tracked by some sort of out-of-stock measure) is also applied. These measures are contradictory. Buyers stock up at the beginning of the month to ensure high levels of customer service, then let inventory drop at the end of the month to "meet" their inventory goals (disregarding the effect on service level measures) The adverse effect is even more pronounced when end-of-quarter incentives are tied to financial reporting. The combined result of this behavior is a monthly order spike to the supplier.

With VMI, the frequency of replenishment is usually increased from monthly to weekly (or even daily), which benefits both sides. The supplier sees a much smoother demand signal at the factory. This reduces costs by permitting better resource utilization for production and transportation; it also reduces the need for large buffer stocks. The vendor can make replenishment decisions according to operating needs, and also has heightened awareness of trends in demand. The consuming organization benefits from legitimately lower cycle stocks, not just low end-of-month inventories intended to make performance lead the

reward system. Even if the buyer has surrendered ownership to the supplier, many benefits arise from improved transportation and warehouse efficiencies. Moreover, service levels will go up at the end of the month or quarter.

In the scheduling domain, unevenly distributed order can result from variations in retail planning calendars. Retailers commonly divide their annual calendars by weekly increments, so that the "month" always has the same number of weekends. This facilitates period-to-period comparisons of sales, revenues and so forth. Alternatives include thirteen four-week "months" to a year; quarters comprised of four week, four week and five week months (4-4-5); and quarters comprised of four-week, five week and four week months (4-5-4).

A buyer who uses a 4-5-4 planning scenario and places orders on a monthly needs to order 25 percent more for the second month of the quarter, even if end user demand remains constant on a weekly basis. If the supplier is unaware of the buyer's planning calendar, then these surges may come as surprises. Worse yet, the supplier may misinterpret them as a reflection of increased user end demand and make incorrect forecasting and purchasing decisions. VMI safeguards against these errors.

In retail supply chains, there is seldom any coordination of orders from the different buyers; it is even rarer to stagger orders from the same buyer for different distribution centers. Orders often arrive simultaneously, making it impossible to fulfill all delivery requests at on time. With VMI, greater coordination supports the supplier's need for smoother production with out sacrificing the buyer's service and stock objectives.

Finally, transportation costs are reduced with VMI. Managed properly, the approach helps increase the percentage of low-cost full truckload shipments and eliminates the higher-cost less than truckload (LTL) shipments. This is achieved by allowing the supplier to coordinate the resupply process instead of responding automatically to orders as they are received.

Another attractive option is more efficient route planning; for example, one dedicated truck can make multiple stops to replenish inventories for several near by customers.

1.1.2. Improved Service

From the retailer's perspective, service is usually assessed by measuring product availability. This is rooted in the simple notion that if a product is not there when the customer walks into the store, then a sale is lost. The consequences are particularly severe when a promotion is running; simply the cost of the lost sale may be compounded by the loss of goodwill. When planning, therefore, a retailer looks to the supplier for dependability. In their merchandising plans, retailers favor their best suppliers with more and more attractive shelf space. Thus, a supplier known for reliability benefits from higher revenues. All else being equal everyone gains from improved service.

With VMI, coordination of replenishment orders and deliveries across multiple customers helps to improve service. A non-critical delivery can be diverted for a day or two to enable a critical delivery to another customer. Similarly, a smaller than usual replenishment to one customer may enable a larger than usual shipment to a customer in dire need. With the ability to balance the needs of all partners, the supplier can improve the system's performance without jeopardizing any individual customer. Customers benefit from the assurance that they are assured that their most critical needs will get the most attention. Without VMI, the supplier has a difficult time prioritizing customer shipments effectively.

Service can be improved further by widening the scope of available solutions to a given problem. For example, in times of crucial shortage, inventory balancing across one customer's distribution centers (or even between customers) may be necessary. In some cases, rebalancing among customers may even be the most economical approach. This is not usually an option with out VMI, for neither suppliers nor customers can see the widespread disposition of inventory. With VMI, stock

balancing can be achieved when customers return product to the supplier, who can send it to another customer. At worst, this approach can result in excessive transportation cost.

The rich get richer, too. When service improves and customers regard the supplier as dependable, two things happen. First, fewer crises occur. Second, when they do occur, customers are less likely to inflate orders in an attempt to seize a larger share of limited supply. The supplier has a more accurate view of demand and can plan more effectively, which leads to better service.

As an additional benefit, the rollover to a replacement product can be facilitated by VMI. There would be less old inventory to flush through the system, so the customer can avoid such drastic measures as a "fire sale". Moreover the new product will be on the shelf sooner. With shared information, the rollover takes place with less upset to merchandising plans and helps the retailer maintain a reputation for being current.

The transportation process used with VMI improves customer service even more. Without VMI, shipments are sometimes rejected by distributors because of communication gaps between centralized buyers and dispersed distribution centers. This problem also appears with overcrowding on receiving docks on busy days. With VMI, however, the supplier typically schedules replenishments and deliveries in advance, hoping to ensure more predictable delivery schedules.

1.2 Background To The Problem

Vendor Management Inventory all over the world are engaging more and more technology and best methods to process and intensify buyer satisfaction in terms of prompt delivery, easy tracking and cost efficiency improved services and saving space. While in Pakistan, situation is different, companies providing Vendor Management Inventory using outdated technology, costs are high, inefficiency in utilization of space and processes are obsolete.

The retail stores has gaps to fill, like inefficient capacity

utilization, poor product availability and high stock levels.

Radio Frequency Identification (RFID) and Electronic Data Interchange (EDI) systems enabling customers online and integrate ecommerce store in real time with another major gaps in how can come up with innovative services like Wal-Mart and other such services. These gap needs to be filled by the retail chains so that they can serve customers better and increase market share and revenue.

1.3 Rationale, Theoretical Or Conceptual Background/Foundation

The term supply chain management was first coined by a U.S. industry consultant in the early 1980s. However, the concept of a supply chain in management was of great importance long before, in the early 20th century, especially with the creation of the assembly line. The characteristics of this era of supply chain management include the need for large-scale changes, re-engineering, downsizing driven by cost reduction programs, and widespread attention to the Japanese practice of management.

In 1985, Kurt Salmon Associates were commissioned to conduct a supply chain analysis. The results of the study showed that the delivery time for the apparel supply chain, from raw material to consumer, was 66 weeks long, 40 weeks of which were spent in warehouses or in transit. The long supply chain resulted in major losses to the industry due to financing the inventory and lack of the right product in the right place at the right time. The result of this study was the development of the Quick Response (QR) strategy. QR is a partnership where retailers and suppliers work together to respond more quickly to consumer needs by sharing information. Significant changes as a result of the study were the industry adoption of the UPC code used by the grocery industry and a set of standards for Electronic Data Interchange (EDI) between companies. Retailers began installing Point of Sale (PoS) scanning systems to transfer sales information rapidly to distributors and manufacturers. "Quick

Response maximizes the profitability of inventory by placing the company's dollars where and when they are needed based on point of sale data plus sales history" (Mullin, 1994). Quick Response incorporates marketing information on promotion, discounts and forecasts into the manufacturing and distribution plan. In 1992, a group of grocery industry leaders created a joint industry task force called the ECR Working Group. The group was charged with examining the grocery supply chain to identify opportunities to make the supply chain more competitive (Kurt Salmon Associates, 1993). Kurt Salmon Associates was engaged by the group to examine the grocery supplier/distributor/consumer value-chain and determine what improvements in cost and service could be accomplished through changes in technology and business practices. The results of the study indicated that little change in technology was required to improve performance, other than further development of EDI and PoS systems. However, the study identified a set of best practices, which, if implemented, could substantially improve overall performance of the supply chain. Through implementation of Best Practices they projected an overall reduction in supply chain inventory of 37 percent, and overall cost reductions in the industry in the range of \$24 to \$30 billion (Kurt Salmon Associates, 1993). A further development from ECR was the concept of Continuous Replenishment (CRP). CRP is a move away from pushing product from inventory holding areas to pulling products on to grocery shelves based on consumer demand (ECR Performance Measures Operating Committee, 1994). Point of purchase transactions are forwarded by computer to the manufacturer, allowing them to keep the retailer replenished and balanced just-in-time.

Various definitions of a supply chain have been offered in the past several years, as the concept has gained popularity. APICS (Cox, et al., 1998) describes the supply chain as:

1) "The processes from the initial raw materials to the ultimate consumption of the finished product linking across supplier-user companies; and 2) the functions within and outside a company that enable the value

within and outside a company that enable the value chain to make products and provide services to the customer."

Another source (Lummus and Alber, 1997) defined supply chain as:

"The network of entities through which material flows. Those entities may include suppliers, carriers, manufacturing sites, distribution centers, retailers, and customers."

1.4 Theoretical Terms

Inventory management is the active control program which allows the management of sales, purchases and payments. Inventory management software helps create invoices, purchase orders, receiving lists, payment receipts and can print bar coded labels. An inventory management software system configured to your warehouse, retail or product line will help to create revenue for your company. The Inventory Management will control operating costs and provide better understanding. We are your source for inventory management information, inventory management software and tools.

1.4.1 Types of Inventory:

Raw materials are inventory items that are used in the manufacturer's conversion process to produce components, subassemblies, or finished products. These inventory items may be commodities or extracted materials that the firm or its subsidiary has produced or extracted. They also may be objects or elements that the firm has purchased from outside the organization. Even if the item is partially assembled or is considered a finished good to the supplier, the purchaser may classify it as a raw material if his or her firm had no input into its production.

Work-in-process (WIP) is made up of all the materials, parts (components), assemblies, and subassemblies that are being processed or are waiting to be

processed within the system. This generally includes all material-from raw material that has been released for initial processing up to material that has been completely processed and is awaiting final inspection and acceptance before inclusion in finished goods.

A finished good is a completed part that is ready for a customer order. Therefore, finished goods inventory is the stock of completed products. These goods have been inspected and have passed final inspection requirements so that they can be transferred out of work-in-process and into finished goods inventory. From this point, finished goods can be sold directly to their final user, sold to retailers, sold to wholesalers, sent to distribution centers, or held in anticipation of a customer order.

Transit inventories result from the need to transport items or material from one location to another, and from the fact that there is some transportation time involved in getting from one location to another. Sometimes this is referred to as pipeline inventory. Merchandise shipped by truck or rail can sometimes take days or even weeks to go from a regional warehouse to a retail facility.

As previously stated, inventory is sometimes used to protect against the uncertainties of supply and demand, as well as unpredictable events such as poor delivery reliability or poor quality of a supplier's products. These inventory cushions are often referred to as safety stock. Safety stock or buffer inventory is any amount held on hand that is over and above that currently needed to meet demand. Generally, the higher the level of buffer inventory, the better the firm's customer service.

Slow-moving, or obsolete, inventory poses many concerns to companies, their lenders, vendors and shareholders. Cash tied up in idle inventory can create a negative impact on the company's profitability. Lenders are concerned with the overextension of credit against such inventory, while vendors are concerned with potential returns.

How do we Value Inventory? The accounting method that a company decides to use to determine the costs of inventory can directly impact the balance sheet, income statement and statement of cash flow. There are three inventory-costing methods that are widely used by both public and private companies: First-In-First-Out (FIFO): This method assumes that the first unit making its way into inventory is the first sold.

Last-In First-Out (LIFO): This method assumes that the last unit making its way into inventory is sold first. The older inventory, therefore, is left over at the end of the accounting period.

1.5 Statement Of Problem

To analyze the process of Vendor Managed Inventory at Retail Chain Stores.

1.6 General Problem

Using outdated technology, costs are high, inefficiency in utilization of space and processes are obsolete.

1.7 Specific Problem

- * Obsolete Technology
- * Obsolete Method and technique
- * Inefficiency in utilization of space

1.8 Purpose Of The Research Project

The main purpose and the aim of my research project are to compare the superior client service, distribution lead time and technology usage of retail store, and to give possible solutions how to improve superior client service, how to minimize distribution lead time, costs effectiveness, efficient technology usage and utilization of space.

- * Harmony Locally
- * Harmony with International Vender Management Inventory procedure.

1.9 Research Question

These are the three areas in which the research is conducted:

- ✱ Obsolete Technology
 - a. Modern electronic components used in VMI like, Wal-mart
 - b. SMS updates
- ✱ Utilization of space
 - c. Online ordering at pick up point
 - d. Entire Process Cycle
 - e. Business Model
- ✱ Innovation
 - f. Wal-mart
 - g. Target
 - h. Shopko

1.10 Statement Of The Hypothesis

Hypothesis 1:

Ho: Vendor management inventory success in retail chain is independent of obsolescence processes.

Ha: Vendor management inventory success in retail chain is not independent of obsolescence processes.

Hypothesis 2:

Ho: Vendor managed inventory success in retail chain is independent on inefficient capacity utilization.

Hb: Vendor managed inventory success in retail chain is not independent on inefficient capacity utilization.

1.11 Significance Of The project

The significance of this research is to reveal the factors that raise the performance and productivity of local retail stores and compare how it could perform well in local as well as international market. Various factors were taken into consideration to evaluate the factors such as technology, services, utilization of space etc. The main purpose of this project is to analyze the comparison of technology, distribution lead time and,

customer service usage of retail super market in Pakistan.

The research will help the vendors to fill their gaps and to improve and leave positive impact on the company.

This research will help those who will carry on the research in this field. Moreover, this research will help the supermarket in Pakistan to understand various methods for vendor managed inventory. It will help researchers as the base line for next level research. It will help other businesses to optimize their inventory for optimum level.

1.12 Assumptions

- ✱ Vendors are not providing joint ventures.
- ✱ Vendor managed inventory are not cost efficient.
- ✱ Vendor managed inventory does not meet the customer attraction retention and/or requirements.

1.13 Limitations

While making this project I found some of the limitations by the company because they said that they cannot exceed or they are not allowed to disclose such information because of the competitor.

- ✱ Time limit was also a barrier while executing this research.
- ✱ Retail Chains did not provide details of their different processes.
- ✱ Financial constraint is very big while doing this research because with a limited finance.
- ✱ Retail Chains did not provide complete information as it is their company policy.

1.14 Delimitations

As I found some limitations so there were also some delimitations which I found while making this project.

- ✱ This research is conducted locally in Pakistan.
- ✱ Due to financial constraint this research has been conducted in Karachi.

- * This research focus on big retail chain stores which are MAKRO, METRO IMTIAZ and NAHEED super market.
- * Time and finance are the main barriers.

1.15 Definition Of Terms

Supply chain management: A supply chain is the stream of processes of moving goods from the customer order through the raw materials stage, supply, production, and distribution of products to the customer.

Inventory: A detailed, itemized list, report, or record of things in one's possession, especially a periodic survey of all goods and materials in stock.
Vendor: A company which supplies parts or services to another company, also called supplier.

Vendor Managed Inventory: A means of optimizing Supply Chain performance in which the manufacturer is responsible for maintaining the distributor's inventory levels. The manufacturer has access to the distributor's inventory data and is responsible for generating purchase orders.

System Application Products (SAP): A company that develops software which allows business to track customer and business interactions. SAP is well-known as Enterprise Resource Management (ERM) and data management programs.

Customer: A person, company, or other entity which buys goods and services produced by another person,

company, or other entity.

JIT: A strategy for inventory management in which raw materials and components are delivered from the vendor or supplier immediately before they are needed in the manufacturing process.

Logistics Management: Application of management principles to logistics operations for efficient and cost effective movement of goods and personnel.
Lead Time: The amount of time between the placing of an order and the receipt of the goods ordered.

Business Model: The plan implemented by a company to generate revenue and make a profit from operations. The model includes the components and functions of the business, as well as the revenues it generates and the expenses it incurs.

Communication: The exchange of thoughts, messages, or information, as by speech, signals, writing, or behavior.

GAP Analysis: The process through which a company compares its actual performance to its expected performance to determine whether it is meeting expectations and using its resources effectively. Gap analysis seeks to answer the questions "where are we?" (Current state) and "where do we want to be?" (target state).

Warehouse: A place in which goods or merchandise are stored; a storehouse.

Chapter: 02

LITERATURE REVIEW

2.1 Introduction

Vendor managed inventory (VMI), as a special form of vendor-retailer coordination, has recently gained an increasing recognition. In a VMI contract, the vendor/supplier is authorized to manage inventories of agreed upon stock-keeping-unit at retail locations. Since, the vendor has the liberty of controlling the downstream re-supply decisions, rather than placing orders as they are placed, consequently, the VMI approach offer ample opportunities for synchronizing inventory and outbound transportation decisions. In some VMI applications, the vendor not only manages the retail inventory but also owns it, e.g. Procter & Gamble and Wal-Mart.

the "one warehouse N-retailer problem" where multiple buyers/retailers are modeled.

According to Ref. 32, previous researches in buyer-vendor coordination can be divided into two streams. One concentrates on developing cost efficient replenishment policies minimizing system-wide costs and the other analyzes whether price adjustment strategies benefit both parties. Further, models of this area are distinguished by constant versus dynamically changing or stochastic demand. Examples for the case of constant demand include (Refs. 13, 16–18, 22, 24, 32, 34 and 35). For the cases of dynamically changing and stochastic demands, (please see Refs. 1, 7–10, 20 and 31) for dynamic demand problems, and see Refs. 4, 21 and 26 for stochastic demand problems.

2.2 Literature Review

This study is the evaluation of vendor managed inventory of Retail Chains stores in PAKISTAN. The literature review in this study synthesizes and critically examines different writer's analysis in relation to VMI. The research aims is to reveal knowledge about the overall performance and the currently applied strategies in VMI by major companies. The literature review is taken from different, writers' available research studies, and website of major companies that adopting VMI system. The resources of VMI system are very less as compare to opportunities and also it is argued that such resources may be utilized but they do not be used effectively and efficiently. However, there is a lot of literature available which is written on VMI concept but the literature on financial performance of VMI system is not easily accessible and it is too short. In fact, the buyer-vendor coordination problem originally deals with joint optimization of vendor's and buyer's inventory policies to minimize system-wide costs (see Refs. 13 and 28). Reference 15 reviews the literature of this area until the late 1980s. An important generalization of the problem is known as

As a special form of buyer-vendor coordination, the VMI contracts have gained much attention recently. Reference 4 provides an (s, S, T) policy for VMI system and presents an analytical model for coordinating inventory and transportation decisions in VMI systems. In the system considered by Ref. 4, a vendor realizes a sequence of random demands from a group of retailers located in a given geographical region. Ideally, the vendor should ship these demands immediately. But under the (s, S, T) policy, the vendor holds small orders until an agreeable dispatch time T with the expectation that an economical consolidated dispatch quantity accumulates.

Further, a renewal theoretic model for the case of Poisson demands is developed and the analytical results are presented. However, Ref. 4 ignores the retailers' costs. In fact, to serve the consumer, most retailers must undertake replenishing and holding costs for inventories which are kept at the retail locations. In addition, the implied assumption that retailers are willing to wait at the expense of waiting cost, does not fit in with the trend to improve the vendor's service level.

In this paper, we present an $(s, S; s(k), c(k), S(k))$ stock replenishment and shipment scheduling policy for VMI system. Similar to most models in this area, single vendor multi-retailer problem is considered. We assume that there exists several retailers located in an area whose inventories are replenished by the same vendor and each retailer faces exogenous, random and independent demand process for a single commodity. The vendor takes an (s, S) inventory and replenishment policy and the retailers utilize can-order policies. Under the can-order policy, each retailer's inventory is controlled by three variables $s(k)$, $c(k)$ and $S(k)$. When the inventory position of any retailer reaches its must-order level $s(k)$, a replenishment order is placed. The vendor then checks all the other retailers to decide whether they are involved in the dispatch. A retailer j will be involved in the order if and only if his inventory position is at or below its can-order level $c(j)$. Finally, the vendor immediately replenishes all the involved retailers' inventory to their order-up-to level $S(k)$. In fact, the can-order policy is first introduced by Ref. 2 and has been discussed a lot for the coordinated multi-item inventory system, where several items are purchased from the same supplier and coordination of replenishment orders may allow use of "group" quantity discounts (see Refs. 2, 12, 23, 27, 29, 33 and 36). As mentioned by Ref. 12, their model "applies equally well when there are several locations instead of several products: a central depot coordinates the replenishment process for a set of locations with exogenous, random and independent demand process for a single commodity". Therefore, the can-order policy fits well with the VMI system. However, the preexisting literatures for the can-order policy are all discussed in the framework of single echelon to minimize the buyer's cost, and thus its effects on the vendor's cost have not been considered.

In this paper, a two-echelon single-vendor multi-retailer model is studied. We assume that the demands which related to each retailer are exogenous, random and independent and that related to the vendor are endogenous and determined by the given policy. Further, immediate replenishment is assumed and backlog is not allowed. The costs considered include

the replenishment cost and inventory holding costs for both vendor and retailers. Our purpose is to find the optimal policy minimizing the system-wide average costs.

This paper is divided into five parts. Section 2 introduces and analyzes the problem in detail. In Sec. 3, the general formulations for related costs are presented and the general model for the problem is developed. In Sec. 4, we obtain the optimal policy parameters through simulations and the new policy parameter c 's effects on the considered system are analyzed. Concluding remarks are represented in Sec. 5.

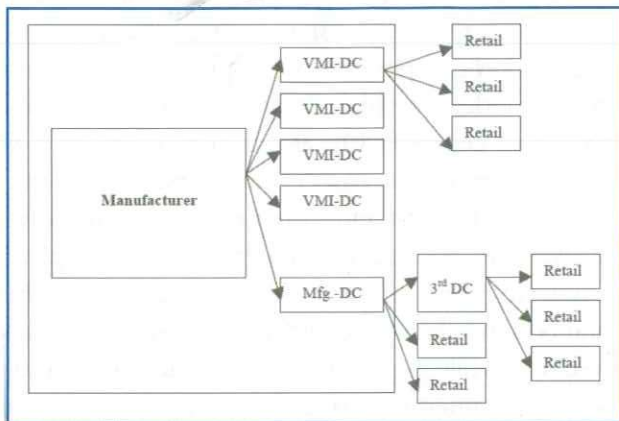
The effect of VMI on supply chain inventories, a comprehensive group of scenarios as part of an investigation at Hewlett-Packard. Using simulation techniques, we generated our supply chain model to represent a large variety of industries. We made sure to include key components of supply chains and home computer industries: high demand ability and multiple distribution channels. Other recent research on VMI has concentrated on grocery and apparel industries. For example Cachon and Fisher examined forecasting and inventory management under VMI for Campbell's Soup. Using simulations of their ordering rules they found both retailer and manufacturer's inventories could be reduced while improving service. They did consider cases with limited manufacturing capacity and issues related to allocating inventory across retailers. In another study, Narayanan and Raman developed a simple analytic inventory model to examine the benefits of VMI when product demand is influenced by product availability. They found that transferring stocking decisions to the manufacturer can lead to increased channel profits. Finally a number of studies have established and characterized the value of centralizing inventory in a supply chain. In our research, we have established the effect of VMI in environments with different levels of demand variability, limited manufacturing capacity and partial channel adoption.

Figure shows our supply chain. It includes one manufacturing plant that supports all retailers through distribution centers of several types: manufacture

owned (Mfg.- DC), retailer owned (VMI-DC) and 3rd party owned (3rd DC). Large customers with their own DCs are supported by direct shipments from the factory: they are likely VMI candidates and we include several of them. The relative size and frequency of orders from these customers were key variables in the analysis. In our scenarios, we examined the effect of reducing order frequency from every four weeks (traditional in many industries) to once every two weeks, every week, or even daily (under VMI).

Manufacture also maintained its own DC, which supported a mix of small and medium sized customers. According to scenarios, these customers depend on direct-to-store shipments or third-party distributors (as shown below):

Supply Chain Model



Above figure depicts the channels through which products move from manufacturers through DC's to retail outlets. Each retailer owned DC faces a daily demand from the retailer's stores. The manufacture receives daily orders from the customer and places delivery replenishment orders to the factory. The daily demand faced by all DCs is normally distributed, with relative variability being another point of our analysis.

Inventories at each DC were adjusted to achieve a 90 percent item fill rate in each scenario. The factory produced enough to meet orders received daily. When these orders exceeded capacity, the orders from major customers were filled on a first-come, first-served basis. Daily priority was given first to major customers,

then to the internal DC. Upon completion of a major customer order, the product was packaged and transported to the retailer's DC. Transportation time varied from two to four days and was randomly generated according to discrete distribution (25 percent two days, 50 percent three days, and 25 percent four days).

The boxed area in the figure indicates our scope of interest. We tracked demand and inventory at the manufacture's DC and the retailers DC; We omitted third party DC or store level inventories from the analysis since we were concentrating at VMI on the first-tier DC level. Our baseline scenarios were simulated with average total demand representing 85 percent of manufacturing capacity. The total plant capacity was 1,970 units/day (with no overtime permitted), so the average daily demand was 1674.5 units. This demand was split among the seven DCs (30 percent and the manufacture's DC (70 percent).

The key dimension for our simulation scenarios was the order frequency from major customers. Ordinarily, retailer DCs placed orders every one, two, or four weeks to restore inventory to the target level (one delivery per order). With our model of VMI, by contrast, replenishment quantities for seven major retailers were computed daily (retailer orders were filled in their entirety) Only full trucks were used, with stop-offs at each DC, as needed. The amount shipped to each customer was upward or downward to ensure that full trucks left the manufacture. When the seven DCs together did not require at least half a truckload no shipment was made at all.

How does a traditional supply chain compare to a vendor managed inventory supply chain when it comes to performance during disruptions? In her 2005 paper, **the impact of transportation disruptions on supply chain performance**, Martha Wilson found out, not surprisingly, that vendor managed inventory (VMI) fares better than the traditional retail managed inventory, even when looking at the whole supply chain:

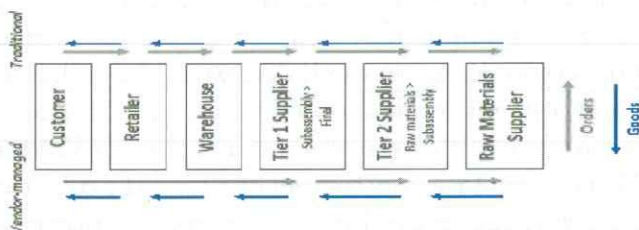
Raw Material Supplier – Tier 2 Supplier – Tier 1 Supplier – Warehouse – Retailer – Customer.

2.2.1 The Model

The model used in this simulation is traditional 5-echelon supply chain:

- ⊙ Customer
- ⊙ Retailer
- ⊙ Warehouse
- ⊙ Tier 1 Supplier (Subassembly > Final)
- ⊙ Tier 2 Supplier (Raw Materials > Subassembly)
- ⊙ Raw Material Supplier

In the traditional supply chain setup the orders flow from top to bottom, and the goods flow from bottom to top.



In a vendor managed inventory setup, customer demand numbers are passed directly to the tier 1 supplier, who then ships to the warehouse for distribution by the retailer, while sending backorders to the tier 2 supplier, according to customer demand.

2.3 SUMMARY of the LITERATURE REVIEW and Justification of the Research Project:

In this era the inflation now become destructing thing for the survival of business. The balance between demand and supply is very difficult to maintain. Now, all over the world there is a concept which is growing very fast and it is VMI. VMI stands for Vendor managed inventory. The vendor monitors the buyer's inventory levels (physically or via electronic messaging) and makes periodic resupply decisions regarding order quantities, shipping, and timing.

In this literature review I have discussed the importance of VMI which is very useful for the retailer and supplier in terms of reduce cost and improved services. As said by **(Raghunathan and Yeh) (2001)** the implementation of continuous replenishment programs (CRP, a supply chain initiative akin to VMI) is beneficial to both manufacturers and retailers in terms of inventory reductions. Inventory reductions are affected by characteristics of consumer demand.

This research is necessary to find out the problems which a retain chain store like MAKRO is facing and to help them solving these problems like inefficiency of utilization of space, obsolete technology etc.

The research has also been done but it is done n the world wide perspective. Here in Pakistan there is different scenario so I want to research according to our scenario.

Chapter No – 3:

RESEARCH DESIGN AND METHODOLOGY

3.1 Population Of The Research Project

Population of my research area belongs to four main retail chain stores which are MAKRO, IMTIAZ, CHASE UP and METRO. The population of my research is around 500. To obtain the best result I am focusing on a multinational and a national retail stores. The retail chain stores provide data to analyze the research. The data collected from retail chains MAKRO, IMTIAZ, CHASE UP and METRO that consists of monthly, quarterly, bi-annually and yearly sales reports.

Procurement managers, Logistic managers, Top management, Executive level managers, inventory manager, supervisors and workers are the population of my research study of various retail chain stores in Karachi.

I have taken the main retail chain stores that implement Vendor Managed Inventory concepts in my population of research.

3.2 Sampling procedure

Sampling method for this research project is **convenience sampling method**. Convenience sampling method is the non-probability sampling technique. I choose this technique because of shorter time period and also the population is too large that it is impossible to get the views of every individual. Convenience sampling is also fast and cost effective.

I use convenience sampling method. My research method is descriptive. The method is used to collect data are questionnaires and interviews from related departments.

For this research my respondents are Procurement managers, Logistic managers, Top management, Executive level managers, inventory manager,

supervisors and workers of supply chain department. The retail chain store is MAKRO is situated at Shahra-e-Faisal and IMTIAZ super market has two branches at Tariq road and another one is at Bahdurabad whereas METRO is situated near Nipa and Chase Up is situated at Buhadarabad. As for the achievement of neutral results I will try to be unbiased during my research project. Also I have tried to get the answers from the people who can give the best answers of my questions.

3.3 The Sample

In the whole population, collection of data is very difficult therefore data will be collected from the sample of population that represents the whole population. In my research data would be collected from 140 respondents which are from concern department of the retail chain stores. Due to Vendor Management Inventory concept data would be collected from top management, logistic managers, sales manager, procurement manager, Inventory management managers that have knowledge and work area related to VMI.

Sample Size calculation

Data

$n = ?$

$Z = 1.96$

$P = 10\% \sim 0.10$

$E = 5\% \sim 0.05$

Calculation:

$$n = \frac{Z^2 [P (1 - P)]}{E^2}$$

$$n = \frac{1.96^2 [0.10(1-0.10)]}{0.05^2}$$

$$n = \frac{3.8416 \times 0.09}{0.0025}$$

$$n = 139.57 \text{ or } 140 \text{ Employees.}$$

3.4 Finalize Instrument After Pre-testing

For this project I will use questionnaire. The questions will be in a close ended format. I'll use Likert scale. A Likert scale is a scale which gives five to seven choices to the respondents. Rating scale might be in this form: Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree. Mathematical numbers has been allotted to all of them for coding the responses of every individual. i.e. Strongly Agree = 1, Agree = 2, Neutral = 3, Disagree = 4, Strongly Disagree = 5. After the collection of data, SPSS would be used for analysis according to the responses.

A questionnaire has been distributed to respondents. By using this method the researcher is confident that the answers are accurate and without any ambiguity. The research is descriptive. The questionnaire would be distributed among the number of respondents in the concern departments.

3.5 Validation Of Instrument

I gave the questionnaire to the concern person who works in a related field and he fills this questionnaire without any problem as this questionnaire is very simple and easy to understand.

3.6 Ethical Standards Followed

- * Potential respondents have the freedom to choose any option given for every option
- * No one has been enforced to fill out the questionnaire
- * This research is only for education purpose, there is no commercial use for this research.
- * The questionnaire has not threat to any company/organization.

3.7 Data Collection

Data has been collected from concern departments in Retail Chain Stores. The questionnaire is distributed to the number of people in different departments which includes Logistic Manager, Inventory Manager,

Procurement Manager, Staff and workers. The questions included in questionnaire are only for the purpose of the research. No personal questions have been asked. The questionnaire contains all the questions which are related to Vendor Management Inventory. This questionnaire will help in the error free data which could make the research worthy.

3.8 Data Preparation

In this questionnaire there are five options available in each question. The respondents are allowed to choose only one best possible option against each variable. The data collected on the basis of Likert scale to perform the best possible statistical analysis. As the Likert scale gives the benefits of options with each variable, the respondent has to mark one option out of five Strongly Agree = 1) Agree = 2) Neutral = 3) Disagree = 4) Strongly Disagree = 5). In statistical analysis Cross tab method is used.

3.9 Operational Definition of Research Variables

There are so many reasons which influence retail chains to implement Vendor Management Inventory but some major factors which give optimum level of benefits to retail chains are: Reduce Cost, save time, improved services, less inventory, improves cash flow, relationship with supplier and many more.

All the essential variables have been included in the questionnaire for the purpose of data collection. The variables are given numbers from one to five. After the collection of required data these determinants according to their numbers are transferred in Likert scale for the suitable analysis.

3.10 Procedure For Hypothesis Testing

Hypothesis 1:

Ho: Vendor management inventory success in retail chain is independent of obsolescence processes.

Dependent Variable: Obsolescence

Processes

Independent Variable: Vendor Managed Inventory

To check the relationship between the hypothesis I use cross tabulation which represents the relationship between variables with any error.

HYPOTHESIS2:

Ho: Vendor managed inventory success in retail chain

is independent on inefficient capacity utilization.

Dependent Variable: Inefficient Capacity Utilization

Independent Variable: Vendor Managed Inventory

To check the relationship between the hypothesis I use cross tabulation which represents the relationship between variables with any error.

CHAPTER No – 4:

ANALYSIS OF DATA AND INTERPRETATION OF RESULTS

4.1 Introduction

Data analysis is a means of determining and testing for the extent of convergence, commonality or divergence among data collected during the Research Project, and hence the relationship among variables which these data represent. To analyze the relationship among variables defined in the research project are analyzed using Likert Scale method. For this purpose a questionnaire was prepared and was distributed to different respondents of respected departments that are related to research area. After getting required information, the data was converted to Likert scale for the purpose of analysis. The result shows that most respondents are satisfied with the software they are using at there stores. In MAKRO respondents replied any other software used 100%, in METRO it is 80%, in IMTIAZ they were 100% and in CHASE UP respondents were satisfied 75%. Also all the stores are using the vendor management inventory and are very much satisfied because of the work pressure has been decreased so much and now vendors are responsible for the replenishment of the goods.

4.2 Hypothesis –By-Hypothesis Presentation and Analysis of Data and the Interpretation of Results:

Hypothesis 1:

Ho: Vendor management inventory success in retail chain is independent of obsolescence processes.

Chase up:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Q9 * Q13	35	100.0%	0	.0%	35	100.0%

Q9 * Q13 Cross tabulation

Count		Q13			Total
		1	2	3	
Q9	1	1	0	0	1
	2	4	0	1	5
	3	0	27	2	29
Total		5	27	3	35

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	30.929 ^a	4	.000
Likelihood Ratio	28.654	4	.000
Linear-by-Linear Association	12.004	1	.001
N of Valid Cases	35		

a. 8 cells (88.9%) have expected count less than 5. The minimum expected count is .09.

Symmetric Measures

	Value	Approx. Sig.
Nominal by Nominal Phi	.940	.000
Cramer's V	.665	.000
N of Valid Cases	35	

INTERPRETATION:

In above given output I use the Pearson's Chi-Square to interpret the result. They are statically significant as ($p > 0.01$) which indicates that I can be quite certain that vendor management inventory success in retail chain is independent because of obsolescence processes since 3x3 table which is $> 2 \times 2$ table so I would read Creamer's value significantly $p < 0.05$ instead of phi value.

Result:

To investigate whether vendor management inventory success in retail chain is independent because of obsolescence processes are not a chi square statistics was used. Above table shows the Pearson chi-square results and indicate as $p < 0.05$ so it rejects null hypothesis.

Hypothesis 1:

Ho: Vendor management inventory success in retail chain is independent of obsolescence processes.

IMTIAZ:

Case Processing Summary

		Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Q9 * Q13		35	100.0%	0	.0%	35	100.0%

Q9 * Q13 Crosstabulation

Count						
		Q13				Total
		1	2	3	5	
Q9	1	30	0	0	0	30
	2	0	2	0	0	2
	3	0	0	1	0	1
	4	0	0	1	0	1
	5	0	0	0	1	1
Total		30	2	2	1	35

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.050E2 ^a	12	.000
Likelihood Ratio	39.257	12	.000
Linear-by-Linear Association	32.958	1	.000
N of Valid Cases	35		

INTERPRETATION:

In Above given output I use the pearsons chi-square to interpret the result. They are statistically significant as ($p < 0.01$) which indicates that I can be quite certain that vendor management inventory success in retail chain is independent because of obsolescence processes since 5x5 table which is greater than 2x2 table so I would read Creamer's value significantly $p < 0.05$ instead of phi value.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	1.732	.000
	Cramer's V	1.000	.000
N of Valid Cases		35	

Result:

To investigate whether vendor management inventory success in retail chain is independent because of obsolescence processes are not a chi square statistics was used. Above table shows the Pearson chi-square results and indicate as $p < 0.05$ so it rejects null hypothesis.

Hypothesis 1:

Ho: Vendor management inventory success in retail chain is independent of obsolescence processes.

MAKRO:

Case Processing Summary

		Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Q9 * Q13		35	100.0%	0	.0%	35	100.0%

Q9 * Q13 Crosstabulation

Count		Q13			Total
		1	2	3	
Q9	1	25	5	0	30
	2	0	0	2	2
	3	0	0	2	2
	4	0	0	1	1
Total		25	5	5	35

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	35.000 ^a	6	.000
Likelihood Ratio	28.708	6	.000
Linear-by-Linear Association	21.946	1	.000
N of Valid Cases	35		

a. 11 cells (91.7%) have expected count less than 5. The minimum expected count is .14.

INTERPRETATION:

In Above given output I use the Pearson's chi-square to interpret the result. They are statistically significant as ($p < 0.01$) which indicates that I can be quite certain that vendor management inventory success in retail chain is independent because of obsolescence processes since 3x4 table which is greater than 2x2 table so I would read Creamer's value significantly $p < 0.05$ instead of phi value.

Symmetric Measures

	Value	Approx. Sig.
Nominal by Nominal		
Phi	1.000	.000
Cramer's V	.707	.000
N of Valid Cases	35	

Result:

To investigate whether vendor management inventory success in retail chain is independent because of obsolescence processes are not a chi square statistics was used. Above table shows the Pearson chi-square results and indicate as $p < 0.05$ so it rejects null hypothesis.

Hypothesis 1:

Ho: Vendor management inventory success in retail chain is independent of obsolescence processes.

METRO:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Q9 * Q13	35	100.0%	0	.0%	35	100.0%

Q9 * Q13 Crosstabulation

Count		Q13			Total
		2	3	4	
Q9	1	1	0	4	5
	2	4	5	21	30
Total		5	5	25	35

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.027 ^a	2	.598
Likelihood Ratio	1.721	2	.423
Linear-by-Linear Association	.009	1	.926
N of Valid Cases	35		

a. 5 cells (83.3%) have expected count less than 5. The minimum expected count is .71.

INTREPRETATION:

In Above given output I use the Pearson's chi-square to interpret the result. They are statistically significant as ($p > 0.01$) which indicates that I can be quite certain that vendor management inventory success in retail chain is independent because of obsolescence processes since 2x3 table which is greater than 2x2 table so I would read Creamer's value significantly $p > 0.05$ instead of phi value.

Q6 * Q12 Crosstabulation

Count					
		Q12			
		1	2	3	Total
Q6	1	1	0	0	1
	2	2	0	0	2
	3	2	0	0	2
	5	20	5	5	30
Total		25	5	5	35

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.171	.598
	Cramer's V	.171	.598
N of Valid Cases		35	

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.333 ^a	6	.887
Likelihood Ratio	3.688	6	.719
Linear-by-Linear Association	1.811	1	.178
N of Valid Cases	35		

Result:

To investigate whether vendor management inventory success in retail chain is independent because of obsolescence processes are not a chi square statistics was used. Above table shows the Pearson chi-square results and indicate as $p < 0.05$ so it rejects null hypothesis.

HYPOTHESIS 2:

Vendor managed inventory success in retail chain is independent on inefficient capacity utilization.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.333 ^a	6	.887
Likelihood Ratio	3.688	6	.719
Linear-by-Linear Association	1.811	1	.178

a. 11 cells (91.7%) have expected count less than 5. The minimum expected count is .14.

INTREPRETATION:

In Above given output I use the pearsons chi-square to interpret the result. They are statistically significant as ($p > 0.01$) which indicates that I can be quite certain that vendor management inventory success in retail chain is independent because of obsolescence processes since 3x5 table which is greater than 2x2 table so I would read Creamer's value significantly $p > 0.05$ instead of phi value.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Q6 * Q12	35	100.0%	0	.0%	35	100.0%

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.258	.887
	Cramer's V	.183	.887
N of Valid Cases		35	

Result:

To investigate whether vendor management inventory success in retail chain is independent because of obsolescence processes are not a chi square statistics was used. Above table shows the Pearson chi-square results and indicate as $p < 0.05$ so it rejects null hypothesis.

HYPOTHESIS 2:

Vendor managed inventory success in retail chain is independent on inefficient capacity utilization.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Q6 * Q12	35	100.0%	0	.0%	35	100.0%

Q6 * Q12 Crosstabulation

Count		Q12			Total
		2	3	5	
Q6	1	2	0	26	28
	2	0	0	2	2
	3	0	0	2	2
	4	0	1	1	2
	5	0	0	1	1
Total		2	1	32	35

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	49.961 ^a	4	.000
Likelihood Ratio	38.308	4	.000
Linear-by-Linear Association	.259	1	.611
N of Valid Cases	35		

a. 8 cells (88.9%) have expected count less than 5. The minimum expected count is .34.

INTREPRETATION:

In Above given output I use the Pearson's chi-square to interpret the result. They are statistically significant as ($p > 0.01$) which indicates that I can be quite certain that vendor management inventory success in retail chain is independent because of obsolescence processes since 3x3 table which is greater than 2x2 table so I would read Creamer's value significantly $p > 0.05$ instead of phi value.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	1.195	.000
	Cramer's V	.845	.000
N of Valid Cases		35	

Result:

To investigate whether vendor management inventory success in retail chain is independent because of obsolescence processes are not a chi square statistics was used. Above table shows the Pearson chi-square results and indicate as $p < 0.05$ so it rejects null hypothesis.

HYPOTHESIS 2:

Vendor managed inventory success in retail chain is independent on inefficient capacity utilization.

MAKRO:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Q6 * Q12	35	100.0%	0	.0%	35	100.0%

Q6 * Q12 Crosstabulation

Count		Q12					Total
		1	2	3	4	5	
Q6	2	0	5	0	0	0	5
	3	2	3	0	0	0	5
	4	0	22	1	1	1	25
Total		2	30	1	1	1	35

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.422 ^a	8	.026
Likelihood Ratio	7.112	8	.525
Linear-by-Linear Association	.252	1	.616
N of Valid Cases	35		

a. 14 cells (93.3%) have expected count less than 5.
The minimum expected count is .03.

INTREPRETATION:

In Above given output I use the pearsons chi-square to interpret the result. They are statistically significant as ($p > 0.01$) which indicates that I can be quite certain that vendor management inventory success in retail chain is independent because of obsolescence processes since 5×3 table which is greater than 2×2 table so I would read Creamer's value significantly $p > 0.05$ instead of phi value.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.706	.026
	Cramer's V	.499	.026
N of Valid Cases		35	

Result:

To investigate whether vendor management inventory success in retail chain is independent because of obsolescence processes are not a chi square statistics was used. Above table shows the Pearson chi-square results and indicate as $p < 0.05$ so it rejects null hypothesis.

HYPOTHESIS 2:

Vendor managed inventory success in retail chain is independent on inefficient capacity utilization.

METRO:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Q6 * Q12	35	100.0%	0	.0%	35	100.0%

Q6 * Q12 Crosstabulation

Count		Q12					Total
		1	2	3	4	5	
Q6	2	0	5	0	0	0	5
	3	2	3	0	0	0	5
	4	0	22	1	1	1	25
Total		2	30	1	1	1	35

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.720 ^a	8	.089
Likelihood Ratio	10.362	8	.241
Linear-by-Linear Association	1.625	1	.202
N of Valid Cases	35		

a. 14 cells (93.3%) have expected count less than 5. The minimum expected count is .14.

INTERPRETATION:

In Above given output I use the Pearson's chi-square to interpret the result. They are statistically significant as ($p > 0.01$) which indicates that I can be quite certain that vendor management inventory success in retail chain is independent because of obsolescence processes since 3x5 table which is greater than 2x2 table so I would read Cramer's value significantly $p > 0.05$ instead of phi value.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.626	.089
	Cramer's V	.443	.089
N of Valid Cases		35	

Result:

To investigate whether vendor management inventory success in retail chain is independent because of obsolescence processes are not a chi square statistics was used. Above table shows the Pearson chi-square results and indicate as $p < 0.05$ so it rejects null hypothesis.

4.3 SUMMARY OF FINDINGS

The core purpose of this project is to analyze the implications of implementing vendor management inventory in the retail giants in Karachi city. The major variables of this research were VMI, Delays & Process Methodology on which we have applied the method of Crosstab to check the dependency and relationship among all 3 variables.

After the application the results was mostly moderate-strong relationship among 2 hypothesis in 4 retail chains which shows that all variables are mostly dependent among each other and have moderate-to-strong relationship.

CHAPTER No-5: MANAGEMENT BRIEF

5.1 MANAGEMENT BRIEF

24

This project research was done to analyze and help the local retail chains which have developed significantly in this market of opportunities in the last decade. The core purpose of this research is to analyze the problems which retail chains are facing in the implementation of vendor management inventory (VMI). There are several problems which retail chains are facing in the implementation of vendor managed inventory.

In my project I focused four retail chain stores that captured the most of the market share. If we talk about the vendor managed inventory it is the process of managing inventory by supplier at the place of customer. The vendor is responsible to manage the inventory level as per demand.

Empty display shelf means, loss of sale opportunities, nor do they want that the items on the shelf are not selling. That's why retailers want the vendor who can manage the shelf efficiently and effectively and also the product having good image in the mind of the people regarding product. Retailers want just the right thing at the right time and they want the vendors to do it without any disruption.

In this regard the retailers search for the vendor who can be the best at any point of time without delaying the process of delivery when the shelf is empty. They want the vendor to keep the shelf up-to-date without the delay process and within the shortest possible time to overcome the vacant space problem.

As international supplier/vendors is far from the actual scenario of the market but he is willing to provide the shortest possible time, lowest possible price, acceptable quality, simplest documentation so that the supplies could not be stuck at port, effective communication and of best value to meet the satisfaction level of

customer and to be competition with local supplier. The purchase manager has to be very careful about the decisions he has taken about switching towards international supplier from local supplier.

The implementation of vendor managed inventory gives number of benefits in every type of business and also in the retail chain. The biggest problem for any retail store is to maintain the **inventory levels**. The vendor is in better position to maintain the inventory because he just have to maintain his part of shelf while if the customer is managing the inventory he will not be in an ideal situation dealing with number of vendor/supplier at a time. Also, the supplier reviews the situation of shelf on a frequent basis which results in better control of the inventory.

Reduction of stock-outs is another benefit of implementing vendor managed inventory. The supplier keeps track of the inventory and takes over responsibility of product availability which results in reduction of stock-outs and results in increasing the customer satisfaction.

By minimizing the impact of stock-outs the probability of the increase in sales is inevitable because the customer find the product at the right time which will increase the trust factor of the customer on the retail chain and in the end the sale goes up.

As the customer is enjoying so much benefits, the supplier is also enjoying the benefits of vendor managed inventory which allows them to see improved visibility results, with VMI processes the retailers sends the POS directly to the vendor, which improves the visibility and results in better forecasting.

VMI also helps in terms of reducing the errors in purchase orders, which increase the cost of supplier because of reverse logistics, so by implementing VMI mistakes and chances of errors will come down.

In the end I would suggest to all the retail chains to implement vendor management inventory to get the maximum benefit and to enjoy the significant increase in sales, having trust of there customer, with lowest possible cost, without any hectic situation faced of stock-outs or over-stocking.

REFERENCE

- I. "Key Success Factors from Leading Retailers." International Journal of Retail & Distribution Management, June-July 1997.
- II. Reynolds, Jonathan. "Retailing on the Net." International Journal of Retail & Distribution Management, February-March 1999.
- III. <http://www.vendormanagedinventory.com/article3.php>
- IV. Matt Waller University of Arkansas. M. Eric Johnson Vanderbilt University And Tom Davis Hewitt-Packard Company
- V. <http://faculty.fuqua.duke.edu/~fernando/bio/Bernstein-Chen-Federgruen.pdf> Bernstein, F. and A. Federgruen (2003), "Pricing and Replenishment Strategies in a Distribution System with Competing Retailers," Oper. Res., 51, 3, 409-426.
- VI. Bernstein, F. and A. Federgruen (2004), "Dynamic Inventory and Pricing Models for Competing Retailers," Oper. Res., 51, 3, 409-426.
- VII. Buzzell, R.D. and G. Ortmeyer (1995), "Channel Partnerships Streamline Distribution," Sloan Management Review, 36, p. 85.
- VIII. <http://misrc.umn.edu/workshops/2004/spring/yandong.pdf>
- IX. Cardenas, A.F.: Technology for Automatic Generation of Application Programs – A Pragmatic View. In: MIS Quarterly, Vol. 1, No. 3, pp. 49 – 72, 1977
- X. [http://vimation.org/files/Vendor\(1\).pdf](http://vimation.org/files/Vendor(1).pdf)
- XI. CEFAC, UN/EDIFACT by UNECE, Directory D . 0 6 A , <http://www.unece.org/trade/untidd/d06a/d06a.zip>
- XII. http://www.dataalliance.com/vmi_retail_sc.pdf
- XIII. Flores, B.E.; Whybark, D.C.: Multiple Criteria ABC Analysis. In: International Journal of Operations & Production Management, Vol. 6, No. 3, pp. 38 – 46, 1986
- XIV. <http://www.vendormanagedinventory.com/articles.php>
- XV. Arnold, Uli: Beschaffungsmanagement, 2nd edition., Stuttgart, p. 1872, 1997
- XVI. http://www.12manage.com/methods_vendor_managed_inventory.html
- XVII. Baudin, M.: Lean Logistics, New York, pp. 230 – 257, 2004
- XVIII. Cheung, K. and H. Lee (2002), "The Inventory Benefit of Shipment Coordination and Stock Rebalancing in a Supply Chain," Management Sci., 48, 2, 300-306. <http://www.enotes.com/management-encyclopedia/inventory-types>
- XIX. <http://www.allbusiness.com/finance/1110570-1.html>
- XX. Aviv, Y. (2004), "Collaborative Forecasting and its Impact on Supply Chain Performance," Chapter 10 in Handbook of Quantitative Supply Chain Analysis, D. Simchi-Levi, S. Wu and Z. Shen eds, Kluwer, Boston, MA.
- XXI. <http://www.investopedia.com/articles/02/060502.asp>
- XXII. Barlas, D. (2003), "Wal-Mart's RFID Mandate," e-Business News, June 4.
- XXIII. http://en.wikipedia.org/wiki/Supply_chain_management#Historical_developments_in_supply_chain_management
- XXIV. Chen, F., A. Federgruen and Y. S. Zheng (2001), "Coordination Mechanisms for a Distribution System with One Supplier and Multiple Retailers," Management Sci., 47, 5, 693-708.
- XXV. <http://www.socialresearchmethods.net/kb/ethics.php>