INVENTORY MANAGEMENT AND ITS EFFECTS ON CUSTOMER SATISFACTION

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Abstract
This study examines inventory management and the role it plays in improving customer satisfaction. It looks at how food companies have been under pressure to streamline their inventory systems, and the consequences of such actions. It also examines how many retailers are trying to implement a "perfect order" system and how suppliers are constantly under pressure to meet the demands of these retailers. Many food companies are, therefore, looking at various inventory management systems as they belief this will have a positive effect on the satisfaction of their customers. The paper also outlines the methodology used in the research and concludes by pointing out the limitations of the research as well as suggestions for further research.

Key Words: Inventory Management, Customer Satisfaction, Grocery Companies.

Introduction

Many food companies have been under pressure to streamline their supply chain, minimize large inventories, and cut holding cost on inventory. In the past, inventory management has focused on not running out of finished goods. This caused manufacturers to stockpile large amounts of raw materials, work in process, and finished goods. The extra finished goods would be to protect them from going out of stock. There are different costs associated with inventory.

The holding cost is when the inventory comprises of raw materials; work in process, or finished goods. The inventory cost is in the range of 20 to 40 percent of annual inventory in Rupees. Another variables associated with the holding cost is the opportunity cost, which comprises of any increase in rents due to the need for more space for inventory, higher rates for insuring the inventory, and the cost of goods that are outdated. Manufacturers and retailers can incorporate technology to assist in the managing of this inventory (Atkinson, 2005).

According to retail historian, Robert Spector, a critical factor for retailers is that they have to have a good inventory system. If the retailer does not have a good inventory system, they will not be able to forecast demands with any kind of accuracy. This might result in them running out of stock every so often (Levinson, 2005).

Customer satisfaction is the way the customer thinks about the company and deals with the meeting or exceeding of expectation over the lifetime of the products and/or services. A company's loyalty and product repurchase comes from achieving customer satisfaction. The measurement of customer satisfaction is not an exact science because of its subjectivity. Because customer satisfaction is non-quantitative in nature, it requires sampling and statistical analysis. There is a gap between customer expectations and performance perceptions when measuring customer satisfaction. As a result of this, it is important to establish a linkage between customer satisfaction and bottom-line results. The term "satisfaction" refers to the quality of products and services, ongoing business relationships, price-performance ratios with respect to products and services, and meeting and exceeding the customer's expectations.

Satisfaction is identified by different industries in different ways depending on the customer's relationships and the nature of the business. Manufacturers may look at the desire of on-time delivery and meeting the requirement of certain specifications. When measuring customer satisfaction, there should be critical variables involved.

Table 1: Variables	
Variables	**Defined**
Customer's Needs	This is defined as having the product on hand to satisfy the customer
Vendor Partnerships	This is defined as sharing information. Example is sales, sales forecast, and inventory.
Data INTEGRITY	This is defined by SKU and location. Data integrity is important to the overall success of inventory management.
Performance measurement	The performance measurement used in respect to financial performance.
Technology	Technology is defined as assisting the retailers with mark down prices and discounts.

Lee and Kleiner (2001) the study of customer satisfaction has shown that there could be a disproportional relationship between cause and effect, or between a factor and its consequence on the organization. For instance, a five percent increase in loyalty can increase profits by 25 to 85 percent (Cacioappo, 2000). Loyal customers are six times more likely to repurchase or recommend the purchase of the product or service to someone else. Studies have shown that on average, four percent of the customers will be dissatisfied or complain about the product and/or service. The various studies have also shown that a dissatisfied customer is likely to tell nine other people, while a satisfied customer will tell five people about the good treatment (Cacioappo).

Edward Marien, director of supply chain management at the University of Wisconsin, defines "perfect order" as when a customer finds the right product, destination, condition, documentation, and cost.

The grocery industry includes the food, beverage, and consumer packaged goods. The grocery industry focuses on perfect order metrics (Blanchard, 2007). To work towards perfect order metrics, there has to be aggressive inventory management, restructuring supply chain operations, and updating standards to the perfect standard. When updating the metrics, this would include the cases shipped vs. the orders on-time delivery, data synchronization, damages and unusable products, days in supply, the ordering time cycle, and shelf level of service (Red Prairie, 2005).

Research Question

The main reason for this research paper is to see how inventory management can be improved to produce the perfect order. In other words, how can inventory management be improved to produce customer satisfaction and the "perfect order"?

The null hypothesis is usually based on the simplest set of assumptions and they do not model reality (Fitch, 1997). The null hypothesis is noted to be H0. H0: Improving inventory management will have no effect on customer satisfaction and assist in improving the "perfect order".

Organizations using modern inventory management processes are utilizing new and more refined techniques. These techniques help to optimize inventories, which decrease inventory and lower costs, and to maximize customer service. With these improvements in inventory management, organizations are becoming more competitive in the delivery of high level customer service and value (R. Michael Donovan and Co., n.d.).

The alternative hypothesis is what the research is hoping to find or prove. The alternative hypothesis is noted to be H1 (Newlin, 2007). H1: Improving inventory management will improve customer satisfaction and assist in improving the "perfect order". The reason for testing the hypothesis is find a way to improve inventory management, in order to have a good affect on customer satisfaction. Another reason for testing the hypotheses is to see if they are true (Weisstein, 2007).

The directional hypothesis expresses how the independent variable affects the dependent variables (Marion, 2004). Using technology in inventory management will improve customer service and vendor partnerships, increase data integrity, and produce detailed performance measurements.

Problem Statement

Inventory management has issues that affect customer satisfaction levels. Many large retailers are expecting manufacturers to provide them with perfect order deliveries. This study examines the relationship between effective inventory management and customer satisfaction with the goal of having complete orders and on time deliveries. This research's purpose is to find ways to improve inventory management, thereby increasing customer satisfaction. Lee and Kleiner (2001) stated that in order to manage inventory management successfully, "retailers should understand customer needs, vendor partnerships, technology, data integrity, and performance measurements".

Literature Review

There are a good number of works that are related to this topic, but two studies are of particular relevance and interest. The first study analyzed a decision maker having the capability to buy from two different suppliers and using the "periodic-review inventory model" (Fox, Metters & Sample, 2006, p. 389). The first supplier was defined by high variable cost and insignificant fixed cost. The second supplier had low variable cost and high fixed cost. When using different suppliers, there were tradeoffs between variable and fixed cost. Other components were considered such as to "make or buy, order routing, temporary labor, and consumer store preference" (p. 390).

The first model was the "concave ordering costs for two suppliers" (Fox, Metters & Semple, p. 393). The x–axis represented the order size and the y-axis represented the order cost. Also, "the n-period dynamic model" was used and it relied on "both quasi-convex and K-convex functions" (p. 393). The first theorem was the "optimal choice" with respect to a "finite horizon," while the second theorem dealt with "convergence of optimal cost." The third theorem was the "optimal choice," but with respect to "infinite horizon," which was used for discounting. The study showed that the use of the "(s, S) policy is optimal for a broad class of two-supplier problems with discount costs and lost sales, provided the demand density is log-concave" (pp. 394-5). According to Fox, Metters and Sample, one of the limitations was the broad view of products. Another was that for backorders, the theorems would have had to be modified.

In the second study, Tracey, Lim and Voderembse (2005) conduct an empirical test to examine the impact of supply-chain management (SCM) capabilities, and to show its effects on business performance. Plus, it was used to determine how competitive position and organizational performance are influenced to some degree by customer-oriented SCM issues. Three processes were identified: "outside-in, inside-out, and spanning capability processes" (p. 181). The "outside-in capability" processes included inbound transportation, material warehousing, inventory control, etc. While the "inside-out capability" processes included packaging and warehousing finished goods (pp. 182-3). The four performance measurements were "perceived product value, customer loyalty, market performance and financial performance" (p. 186).

The study's findings supported the view that the supply chain was an important component of business performance and customer satisfaction. Inside- out and outside-in capacity indirectly had an effect on "the four performance measurements," but the "inside-out capability showed significant direct effects on all four measures

of the performance construct" (Tracey, Lim & Voderembse, p. 186). The spanning capability was found to have both direct and indirect effects on the four performance measures" (p. 190).

Methodology

The researchers located small grocery businesses that had no inventory management system. They arranged with a supplier of an inventory management system who agreed to provide the system to them for free for a period of six months. After that period, they would have to buy the system or return it to the software maker without any charges. The businesses in return agreed to let us conduct a customer satisfaction survey.

Consumer satisfaction can be explored by using customer satisfaction performance surveys. The type of survey has to be qualitative, in part, because it is difficult to use quantitative research methods for customer satisfaction. Open- ended questions help to discover if there are any other issues that may be causing problems with customer satisfaction.

The customer satisfaction can be analyzed by a customer satisfaction survey. The measurement of customer satisfaction will not be exact because it is subjective and in a non-quantitative state, but it will require sampling and statistical analysis (Cacioappo, 2000).

This survey will use the qualitative method, which is very personal and involved interpersonal contact. The researcher goes into the real world and opens up people to see what is inside. Qualitative research is more in-depth than quantitative research (Patton, p. 407). According to Johnson and On wuegbuzie (2004), researchers can also use a mix of the qualitative and quantitative method to increase the strength of a study, and to provide stronger evidence through convergence and collaboration, but this one does not allow for that because of reasons already advanced.

Findings

When using a customer satisfaction survey, there has to be a clear objective. The company should have an understanding of the customer's expectations and their requirements. Then they can determine how the company and its competitors are satisfying these expectations and requirements. Based on the findings of the survey, there should be development of products or standards. The company should look at trends to be able to take action in a timely manner. It is also important to establish standards and priorities to be able to rate these goals. Before the customer survey can be designed, there has to be a determination of how the information will be gathered. How will the information be able to help the organization? In what way can the organization use the information to keep the present customers and to gain new ones (Cacioppo, 2000)?

The survey used a Likert scale which had A) Strongly Disagree B) Moderately Disagree C) Slightly Disagree D) Slightly Agree E) Moderately Agree F) Strongly Agree. The number assigned to each letter was A=0, B=1, C=2, D=3, E=4, and F=5.

TABLE 2, CUSTOMER SATISFACTION SURVEY

Customer Satisfaction and Needs	**Mean**
Organization listens to customer	5.00
Organization resolves complaints quickly	5.00
Organization has new product development role	5.00
Organization has well trained employees.	4.75
Organizations products are worth the money	4.75
Organization delivers products on time	5.00

The surveys were given to three participating retailers and one distributor, all in the grocery industry since that was our focus. While they answered the questions, some of the questionnaires targeted their customers to gauge their level of satisfaction. Our findings did not come as a surprise improved inventory management lead to improve customer satisfaction.

We observed the distributor who hitherto was using a manual inventory "system" and working from "experience." We found out that although he thought he was doing well, his clients (the retailers) were not very satisfied with his performance because within the last 12-month period, he had ran short of supplies on 20 different occasions. After implementing an inventory management system and using it for a 6-month period, the distributor was able to accurately predict demand and therefore stocked the required amount of goods at the right time. During that period, he experienced no shortage. His customers, too, (the retailers) were happy with him. Even more important for him was that he found no need to increase storage space – a thing he was planning to do – because he knew what to order and when.

The retailers too, who were stocking their grocery based on simple "past experience" also implemented an inventory management systems. After using it for a similar 6-month period, each of them realized that they could easily identify products that were in high demand, those that were going out of stock, and also of importance, items that were hardly being demanded. Each of the two "mom- and-pop" retailers were able to avoid loses from over stocking of perishable items soon after the system went into operation. Not only were they able to reduce loses, they were able to satisfy their customers better.

Conclusion

The limitations of the survey were the small number of participants. A further study would take a larger sampling of the population to determine the customers that were having problems with shipments and their overall customer satisfaction. Plus, the middlemen should be examined for shortages and their technology use. The large scale sampling should show more about the shortages and the effect on the financial performance of both the distributors and the retailers.

The problems with the survey included the fact that many participants were confused on the ranking of different things such as customer service, product, product delivery, innovation, and technical services. Other participants complained about the structure of the survey questions and answers.

Also, a further study of the effects of new technologies applications such as RFID will have on the inventory management process in relations to customer satisfaction. The interest in this research was by the fact that major retailers such as Wal-Mart or Tesco, who have been testing and implementing RFID technology, were about to require their vendors to use this technology. We wanted to know whether the same results could come from small grocers.

Finally, it is worth stating that all the small business is opted to keep the inventory management system as they saw how it improved their customer service. It is, therefore, understandable why many food companies are implementing similar systems.

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