

**A STUDY ON RELATIONSHIP BETWEEN INVENTORY LEVEL AND  
SALES QUANTITY AND AN APPLICATION FROM SPORTSWEAR-  
RETAILING INDUSTRY**

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SPORTSWEAR-RETAILING INDUSTRY**

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**Iřık University**

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GRADUATE SCHOOL OF SOCIAL SCIENCES

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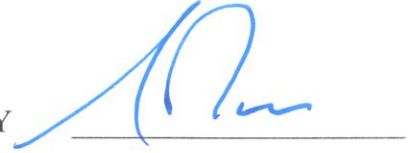
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## **INTRODUCTION**

Businesses of all kinds and scope need customers and achieving their goals of growth is possible, only as long as they efficiently respond to customer needs and keep their customers satisfied. Assuming that the main purpose of a commercial enterprise is creating sustainable profit,then,sustainable profitability is thought to be related to a stable customer structure.Since profitability margins are increasingly being reduced in today's competitive conditions, businesses should re-evaluate their cost structures and related cost items in order to sustain their profits and assets and eventually, to improve them.

Depending on the above-mentioned evaluation, it is necessary to create customer

continuity by maintaining customer satisfaction in order to maintain profitability, while at the same time, reductionary approaches in some cost items are required. Thus, the problem that leads to this study is to present a method that provides both customer loyalty and cost reduction at the same time.

Cost Management is a complicated discipline and venue, so determining which costs can be linked to customer loyalty is the starting point in the study. As well known, there are a wide range of costs faced by firms: investment costs, operating costs, operation costs, personnel costs, stock costs, quality costs, finance costs, etc. As it is directly related to customer demand, inventories and inventory costs are selected as the major point of interest of the study. Furthermore, inventory costs constitute a very important item for many businesses.

The goods that a retailer holds to be sold to customers are called “stocks” and, or “inventory”. The inventories which can be kept in a production facility are composed of raw materials, semi-finished products, finished products, ready-made parts and auxiliary materials. Stocks are measured by the amount of goods held by the retailer in the aisles for a certain period of time and by their monetary cost. Retail businesses can only achieve their objectives by supplying the appropriate amount of products and meeting the consumer needs, in a timely manner. Keeping a large amount of stock, product width and profitability, as well as a small amount of stock holding, also affect sales and customer retention.

Retail stock management is the planning, implementation and control of activities such as placing orders to ensure profitability with appropriate product range, transportation, storage, presentation on shelf and sales costs.

In a retail business, it is possible to see the distribution of inventories within the activities by looking at the structure of stocks, the dynamics of sales and supply. Inventory management involves a certain level of risk and may vary depending on the nature of the distribution channel in which the firm is located. Main success factors related to inventory management are to be named as; the length / shortness of the supply time, the type of product to be stocked and the depth of the product to be stocked. Not only for retail businesses, but also for other businesses, stock-related decisions is a risk factor in the long run. Stock decisions in manufacturing enterprises are directly related to raw materials,

intermediates, business processes and final products, while in retailers only with products to be sold to final consumers. In a relative manner, it can be said that the stock risk in retail enterprises is lower than production enterprises.

The retail business applies inventory management by keeping the product in warehouses and shelves in accordance to the consumer demand. Manufacturers benefit from wholesalers' and retailers' input to take decisions in relation to stocks management. Wholesalers buy large quantities of products and sell them to smaller retailers. Wholesalers are capable of supplying different quantities of products from different manufacturers to retailers. In the case of periodicity of product sales, wholesalers and retailers as distribution channel members increase the amount of stock for the period they expect to be intense. As the variety / quantity increased, the product depth and time risk may also rise for the retailer. Effective inventory management for a retailer is related to the "speed of trading". Stock transfer rate for retailer; annual sales amount / value is measured by the ratio of the average stock amount / value. The inventory turnover ratio also shows how many times the retailer stocks have been re-newed within the period. A possible fact that the inventory turnover ratio increases compared to the previous periods and is above the sector average indicates the retailer's competitiveness. The retailer with a high stock turnover rate quickly converts its stock into cash. It can carry out its activities with high liquidity. The cost of holding stock of a retailer with low inventory turnover increases. We can talk about some elements that should be considered in relation to the inventory turnover ratio. The inventory turnover ratio for each product must be calculated, in a systematic manner.

The possible causes of changes in the inventory turnover rate should be determined and necessary arrangements should be made. The inventory turnover rates of products with seasonal fluctuation should also be taken in consideration. The stock management decision is made in an average-sized market with more than 30,000 products. This rate is made in a discount store with more than 25,000 products, while in large markets this figure reaches to the 50,000. Retailers are pressuring manufacturers and wholesalers to assume more responsibility and contribution in their efforts to reduce stocks risks along with the increasing product range. In this study, the relationship between the increase in stocks and the sales are examined.

## CHAPTER 1

### 1. GENERAL CONCEPTS OF STOCK DEFINITION AND STOCK

#### 1.1. Inventory Management

As we all know, people want to constantly improve and acquire new knowledge as one of their basic needs. Every second the human brain is exposed to new messages. Due to the constant change of needs, the message sent to the brain is undergoing a change. Every new data learned causes the previous one to lose value. Thanks to these new acquisitions, perhaps people make a lot of decisions that can change their lives. The information transmitted to the brain is stored in a depot there, and those that are worthless are forgotten and deleted. Newly acquired information saves them from time to time when they arrive, while information that is forgotten and worthless is often left in a difficult situation. If we consider this situation for an enterprise, it will cost extra to operate as long as the stores are kept in depot history or no longer demanded. However, if we follow the innovations and respond to customer orders in a timely manner and have stock according to the students who are planned in the warehouse, it means that the costs decrease and profit increases.

Today, with the rapid development of technology, consumer preferences are changing rapidly. Large-scale enterprises and small and medium-sized enterprises will want to respond to consumer needs as soon as possible in global economic conditions. In such an environment where there is such competition, businesses need a stocks management system that can reduce profits by reducing costs. So, what is inventory and how should it be managed?

One of the general definitions in this regard is “stockpiling”; measures taken against the pauses in the production process, as well as, waiting for a certain period of time in the presence of uncertainties in demand during the final product phase. In other words, it is all values that have not been sold yet, or are ready for production and can be turned into cash at any time. (Kaya, 2004: 4)

Inventory as an asset on the balance sheet of companies has taken on increased importance because many companies are applying the strategy of reducing their investment in fixed assets, like plants, warehouses, equipment and machinery, and so on, which even

highlights the significance of reducing inventory (Coyle et al., 2003).

Inventory according to the definition of SME; all physical entities and products that participate directly or indirectly in the production of a product in a production system can be considered in the concept of stock. According to another definition; every stored value is considered stock. Stocks are measured in terms of the amount of assets or monetary value. (Kobu, 2008: 327)

Stocks is the amount of finished goods, raw materials and intermediate goods that a firm has at hand at any time in order to meet the sudden needs that may arise and to maintain the production without interruption. (Seyidođlu, 1992: 794-795)

The concept of stock, which is defined differently in commercial and industrial enterprises, varies according to the sectors and characteristics of the enterprises. In terms of industrial enterprises, stock is the amount of finished goods, materials, raw materials and semi-finished products that are kept at hand any time in order to meet the sudden needs that the companies can put forth and to ensure that the production can be continued without interruption. In terms of commercial enterprises; is defined as the amount in a specific date of goods held for sale. (Kaya, 2004: 4-5)

Inventories vary and depend on the type and size of the business. While stocks of industrial enterprises are composed of raw materials and materials, semi-finished goods and finished goods, stocks of commercial enterprises usually consist of commercial goods which are directly traded. (Kaya, 2004: 4)

Stocks is the precondition that businesses have taken against uncertainties. However, building stocks ,by it's own virtue, is never regarded as the absolute goal. Inventories should be reduced even if they can not be destroyed. Stocks has two functional reasons for existence:

- Demand unknown
- Inefficiencies in the system.

Inventory is the subject matter since the demanded quantity is the quantity supplied, or in other words, the order quantity is not fully equivalent to the quantity of supply. (Küçük, 2011: 22-23)

A general definition can be reached in the light of the above definitions; it is imperative to produce or provide services for the continuation of the operation as well as meeting customer requirements on time. This flow can be called as “continuous accumulation” and any accumulation of stock made to gain.

Businesses will need a stock management system to determine the level of inventory, the time of storage, the level of inventory held for exceptional cases, and the problem with which supplier should be studied.

Stocks Management; aims to determine the most economical amount of stock according to the structure of the business by taking into account the production, sales and financial conditions of the business and to keep this amount at the same level. Stocks movements are continuously checked by inventory management. These control systems are reviewed in the following sections. The important point in stock management is to provide the best service against the smallest stock investment. For the best level of service, the stock management and inventory planning is required to reduce the probability of stagnation to the smallest and to maximize the profit of the business. (Tekin, 2009: 2-3)

As a result, it can be said that the companies aim to determine the optimal stock - order quantity for the business by ensuring that the desired products in the production and marketing process are prepared in the required quantity and on time in relation to the stocks management system.

## **1.2. Classification of Inventory**

Among the assets included in stocks; breed, value, place of use, stocking pattern. It would be appropriate to examine them properly by classifying them appropriately:

a-) Raw Materials: All assets entered into and processed on the business are raw materials. The definition of raw material varies depending on the operation. For example, in an iron and steel factory, iron sprouts are raw materials, made of pig iron. However, in a plant that manufactures radiator radiators, pig raw material, radiator slices are manufactured.

b-) Semi-finished Goods: The transactions that must be carried out are the assets held in the intermediate warehouses between the unfinished work stations. Their semi-finished quality is turned into a finished product ,after a while.

c-) Products: All of the transactions that have to be done within the factory are entities which are placed in the warehouse to be delivered to the customers after they are completed. The products do not show much difficulty in terms of counting, evaluation and control as they have completed a certain stage and stopped in a certain place. Controls are made more difficult because of the high uncertainty in raw materials and semi-finished products.

d-) Pre-fabricated Items: those that form part of the product and are generally procured from the outside. These can be simple yet widely used parts such as bolts, nuts, or complex units added to products such as electric motors, gearboxes, generators.

e) Auxiliary Materials: Repair parts, cutting fluid, machine oil and similar materials that are not used or not used directly in the product. (Kobu, 2008: 328)

### **1.3. The Importance of Inventory Management**

Stocks are an inevitable factor for the uninterrupted and continuous flow of work. It is able to accurately determine the stock level which is important for the development and development of enterprises. Having too much inventory or not having enough stock is causing a certain financial expense.

Accurate management of inventories contributes to the organization and control of activities related to the identification, transport, storage and preservation of sources of raw materials, semi-finished products and other materials required for production, which are complementary parts of a production process, and the whole organization works without any hitches. (Kiracı, 2009: 163)

The data on stocks provide information on how managers should implement strategies. Stable and prudent management of inventory management affects the value of stocks.

Having stock can be seen as a useful application especially in inflationary economies. In such economies, the value of stocks can rise due to price increases and earnings can be obtained. In addition to this, purchases to be made just before the price

increases with foresight or a certain number of ties may also generate a certain level of profits. However, it should be known that the actual gain will be achieved by raising the stock turnover rate, that is, by increasing sales. In economies where inflation is low, it is important to keep stocks, demand fluctuations, order delays, etc. loses its meaning except to remove the negativities that it will bring. Therefore, in such economies demand estimates are made correctly, order delivery times can be predicted, or if uncertainties as a whole are reduced as much as possible, it will be rational to avoid stock keeping costs. (Küçük, 2011: 30)

Stock Turnover Rate, shows how many times stocks are converted into sales in one year. The high stock turnover rate indicates that the operator has good stock management. The high rate of stock turnover provides the opportunity to earn more profit from the operation. However, the high inventory turnover rate may indicate that stocks are held in very small quantities at hand and that customer requests can not be answered. An operator's slow turnover rate can lead to higher stock keeping costs, increased financing requirements, and the ability of products to lose sales capabilities. Inventory turnover rate is calculated by the ratio of the annual cost of sales to the average stock level in terms of currency.

Stock Turnover Rate = Cost of Sold Products / Average Stock Value (Yüksel, 2010: 174)

The purpose of the stockholding of the operator is;

1. To be able to carry out production schedule and capacity planning,
2. Protecting against fluctuations in demand,
3. To take measures against any situation that may be experienced in supplying materials from suppliers,
4. To avoid cost inflation effects,
5. To take advantage of the amount of discount, (in case of large quantity orders, more discounts are made than small quantity orders, and as a result unit cost can be reduced).
6. Reduce the ordering costs (the less ordering costs, the less the ordering cost).

(Kiracı, 2009: 163)



### **1.3.1. Inventory Functions**

When the functions of the stocks are called, it is understood that the functions of the stocks and the tasks they fulfill, the situations that cause the stocks to form.

a-) Finished Goods Stock Functions: Uncertainties in customer demand and seasonal or non-seasonal fluctuations cause orders not to be fulfilled. In addition, at the time of production which may occur for various reasons, it may result in failure to meet the demand. Finished product stocks eliminate these shortcomings and provide a stable production plan without major changes in the amount of production.

b-) Functions of Intermediate Stocks: Intermediate stocks are formed among the departments within the enterprise in production as part of an economic mode of production. In this way, production preparation costs can be reduced and production tools can be used more efficiently. Thanks to intermediate stocks, failures or delays that may occur in production units are prevented from stopping production. Balancing can also be achieved by creating intermediate stocks with overtime or shift work between slower workstations with different production rates following each other.

c-) Functions of Raw Material Stocks: The accidents that may occur in the production or transport of the suppliers will cause the production to stop. Raw material stocks eliminate this kind of negativity that would be caused by uncertainties in supply. Besides, when the prices are low, raw material stock is formed by going to purchase way in order to benefit from price advantage or discount possibility. (Top, 2001: 194)

### **1.4. Cost Related to Inventories**

The purchasing cost of the products from domestic or foreign suppliers can also be evaluated within the scope of the preparation costs, general expenses, storage expenses, machinery, equipment, equipment costs, inventory costs, etc.

In addition to this, the alternative cost of money is also an important factor. The entity should consider the use of the money in the alternative financial instruments that it would like to allocate to the stocks and evaluate what their assets may be. It is important that workflow continues here, it is important to work with stock as well as the difficulty of staying stuck.

There are three different costs associated with stocks. These; stock keeping cost, stock keeping cost and order cost.

#### **1.4.1. Cost of Stock Warehousing**

The major concepts are; cost of stock keeping; the costs that an operator has to bear in a certain period. Costs that arise during the operation of the inventory system play an important role in determining the stock policies. These costs vary with the changing stock policy.

Inventory costs are a cost element that must be taken into account when deciding on the optimization of inventory levels.

Cost of stock, cost of stock, quantity, type, place, etc. and they increase directly in proportion to the amount of stock in hand and the increase in holding time.

Inventory costs consist of various components and include costs that vary with the level of inventory held:

Capital Costs Connected to Stocks

Stock facilities and rental depot costs,

Insurance and taxation,

Warehouse management and labor costs,

Costs arising from loss of economic and physical assets of stocks.

#### **1.4.2. Cost of Out of Inventory**

Today, modern businesses now prefer to work with as little inventory as possible. However, in the case of businesses having little inventories or stocks, the demand is subject to some costs due to exceeding the amount of stock in hand:

Cost of lost sales,

Reputation cost,

Partial loss of market share,

Lost scoops,

Frequent order cost is given as

### **1.4.3. Order Cost**

If the given order is met through purchases from outside the business, in general, those are the related concepts: approval of the order, ordering, sending the goods, taking the order, making the acceptance inspection. Costs such as postage, telephone, transportation, determination of the quantity and quantity of the goods, examination workmanship and stationery costs for every activity are the costs that arise after the activities related to the invoice.

The cost of ordering covers all costs from procurement of a substance and material to the delivery of the substance and the material to be used in production.

As the number of orders increases (1,2,3..etc.), the ordering costs also increase. On the contrary, as the order quantity grows (1,000, 1,500, 2,000 ...) the ordering costs are falling. That is, there is an inversely proportional relationship between the order quantity and the order costs, which is directly proportional to the order numbers and the order costs. (Kaya, 2004: 9-19)

Upon order production, the customer specifies the desired product characteristics. In this production, it is not necessary to stock the necessary raw materials or materials. Other costs assessed in this group can be listed as transportation, loading and unloading.

### **1.5. The Importance of Inventory Level in Economy**

Inventories in modern production systems are closely related to the manager. Stocks, which were wealth markings centuries ago, nowadays, increases have come to a state of concern and constant control. Stocks for the operator are figures in the profit and loss calculations and only concern finance managers. However, every department has a role in an efficient stock system. Sometimes it is seen that there is an unnecessary semi-finished stock in an operation that is reported to be in great cash trouble, in the amount that can meet the cash need, distributed among the manufacturing departments. In some enterprises, it is known that there are sufficient raw material stocks, and there are some manufacturing incidents like a few minor parts. Such negativities can cause the business to face significant costs as well as slow down business processes.

Businesses whose competition conditions are getting worse and whose profit margins are decreasing have established a more rigorous control system on their stocks in order to be able to continue their activities. Increased productivity in investments has forced managers to use a more cautious and rational use of operating capital and a more rigorous inventory policy. Businesses have begun to check their inventories ahead of time because they are in a bad situation when they are turning over their excess inventories through measures such as cheap sales. The benefits of such a system in terms of operating economy can be listed as follows;

1. Helps in proper execution of production activities. Due to the lack of material and parts, the empty stays go down to a minimum. Stacking between workstations is reduced.
2. The part connected to the stocks provides a healthy financial management as it is determined according to the exact need.
3. Supply and sales costs are reduced.
4. It is possible to arrange the production programs easily and correctly.
5. Many of the information needed by an effective cost accounting system can be collected in an easy and sensitive manner.
6. Reduce the amount of materials and products that are wasted because of inattention, can be intervened without delay for correction.

## CHAPTER 2

### INVENTORY CONTROL CONCEPT

#### 2.1. Inventory Control Concept

Entries must be supplied or ordered in order to be able to carry on business operations. For this reason, it is possible to have certain stocks, either in the form of safety stocks to meet demand for cycle stochastic or unexpected situations for production of the period concerned, or in the form of intermediate stocks due to waiting and accumulation in production. (Küçük, 2011: 51) Inventories held for these purposes place a certain financial responsibility for the operation. It is therefore of utmost importance to monitor stocks to avoid any setbacks that may arise. Inventory follow-up should be carried out actively between production planning and control, sales, marketing, accounting and, in particular, the warehouse officer, within a plan. In addition, all units must be in an integrated format and the data must be transmitted in a timely manner to these units.

Stock control; is the selection of the most economical position in the monetary direction of the transactions, including the amounts of the semi-finished and finished goods, the order time, the payment terms (advance or futures) price-quantity and the transportation costs of these materials with the first raw material supply. In other words, it is to have the desired commodity ready at the desired time and realize it in the most economical way. (Saygılı, 1991: 138)

The inventory corresponds to independent demand is called distribution inventory/ finished product inventory, while dependent demand inventory is known as manufacturing inventory/raw material inventory and work-in-process (WIP) inventory (Simchi-Levi, Kaminsky & Simchi-Levi, 2004; Toomey, 2000).

Inventory control is the fulfillment of organizational processes for balancing requirements, accumulating and balancing the required materials. (Demir, Gümüsoğlu, 1998: 539)

Stock control; stock quantities and types are determined in the most rational and economical way according to the supply, production and financial possibilities of the enterprises. In short, the main objective in stock control is to carry out production without

interruption by keeping stocks in stock of sufficient amount of what is missing, no more. In addition to this, it helps to find an answer to when and how much supply will be made so that the requested quantity of material can be supplied in the desired quantity, in the desired quantity, at the desired time.

## **2.2. Purpose and Importance of Inventory Control**

The first decision to be made about the stock is the amount of stock, and the second is when the order will be given for the specified quantity. Demand uncertainties include demand forecasting for this and the level of business stock must be determined. Keeping the business stock level low can cause unrequested customer demand and therefore loss of revenue due to lack of stock. For this reason, businesses may seek to increase their stock levels. Having too much inventory causes significant cost elements to the operation. Policies that find the optimum balance between these costs must be identified in order to achieve effective inventory control. In enterprises, inventory control is aimed at keeping stocks at high or low level and minimizing the costs related to stock. (Yuksel, 2010: 172-173)

In the control of stock levels, two limits must be forcibly accepted. Because there are two dangerous situations that the management generally want to prevent. The first is the inadequate inventory that leads to the halt of production and hence the loss of sales, and the second hazardous situation is the inventory that leads to unnecessary transportation costs. The optimal inventory level is somewhere in between these two hazardous situations. Management will determine the amount of stocks at the point where the marginal cost of holding the stock is equal to the expected marginal benefit due to possession of the stock. This is the point of "optimal stock holding". The word "stocks is the grave of many businesses" is extremely common among experts. Experts want to say that bad stock management will cause a fast job. (Özdemir, 2002: 8)

Inventory Control Benefits; The main benefits of an effective inventory control system, which can be achieved through the contribution of all departments, are as follows:

Proper implementation of the stock policy is ensured. It is possible to arrange the stock requirement in accordance with the market movements.

The materials, tools and equipment required by the production activities are

provided in a timely manner without any interruption to the standstill.

It prevents to go to non-economic excess stock investments. It provides the possibility to maintain the minimum amount of stock required by production and procurement policy.

The necessary suitability of the warehouse area guides to prevent damage during storage, take necessary precautions about stocks that will pass through deterioration and fashion.

Provides convenience in cost accounting with accurate and clear production planning. It also specifies what "what, how much and when" should be supplied.

### **2.3. Inventory Control Parameters**

#### **2.3.1. Demand Forecast**

Request; is a purchase request supported by a purchasing power against a good. Demand forecasts are important for building an effective inventory management system. Demand forecasting has a direct impact on the preparation of production plans, the protection of optimal stock levels, and the effective provision of supplies and deviations. The success of the stock level in an enterprise depends on the collection of reliable information, the acquisition of rational stock decisions and the accurate estimation of future profitability. (Kaya, 2004: 80-81)

#### **2.3.2. Procurement Period**

There is usually a period of time between the order for an inventory item and the receipt of the item by the owner, which is called the supply period. Functions such as comprehension of the period requirement, selection of the supplier, negotiation of the price and related conditions, and delivery are realized in this process. In other words, it includes the collection of functions such as procurement, grasping needs, selecting a supplier, negotiating price and related conditions and monitoring delivery. The duration of supply can be fixed and variable. Businesses should take this time into account, when ordering. For example, the goods ordering company has to calculate the ordering time, shipping time, possible faults, otherwise it can be difficult. (Manap, 2003: 12)

#### **2.3.3. Determination of the Order Point**

Ordering is a bespoke process of verbal or written construction for the production, sending, fetching or purchase of goods. The purchasing management of the enterprises

provides the request of the suppliers, the evaluation of the proposals and the application of the approval rules starting from the demand stage of the product. When determining the ordering time, it is necessary to consider parameters such as purchase requisitions, stock levels, supply time, turnover speed, shelf -life.

The main factors to be taken into account when determining the order point are to purchase the best possible quality at the lowest cost and to ensure timely delivery of the goods received.

As Onwubolu et al. (2006) indicates, inventory management techniques should address two important questions: (i) when to order, and (ii) how much to order.

The answers to these questions need to be reached before you can specify the order point.

What is needed?

How much is needed?

When is it needed?

When should the order be given?

The order period can be defined as the inventory planning period. Indicates the time elapsed between when the order is made and when the goods are obtained. The better the methods of communication, fulfillment and transportation, the less stock investments.

#### **2.4. Inventory Control Costs**

It may be more useful if the costs incurred as a result of the transactions carried out within the stock control policies are handled one by one.

1-) Quantity Discounts: A balance must be provided between the discounts that the vendor companies will apply in large purchases and the standard requirement that the operator specifies. Excess purchasing in order to benefit from the amount of discount leads to the cost of stock keeping such as extra storage, insurance, economic depreciation.

2-) Order Costs: It is a cost to carry out activities such as preparation of request forms for a material to be taken from abroad, obtaining informed consent from the necessary departments, conducting research among vendor firms, and approval checks.

3-) Direct Material Costs: Generally, the first material used is directly proportional to the produced quantities and there is not much effect of order volume. However, in some



cases, the amount of discarded and discarded material is high at the beginning, such as setting looms and learning workers. Therefore, in such a case, the enterprise faces a cost element.

4-) Direct Labor Cost: It takes a while for the worker to learn a number of operations even if they have been done before. The learning period depends on the complexity of the operations and the experience of the worker. The smallness of order volume, that is, frequent product change, reduces the labor cost gain through learning. It may be more economical to take advantage of this advantage by keeping stock levels slightly higher. Increasingly directing firms to full automation has reduced direct labor costs. This can be said to be the maintenance and repair cost of the machines.

5-) Overtime and Shift Costs: In order to meet the fluctuations in sales, it may be considered to increase the production with overtime or shift system in the high demand period instead of pre-stocking the excess demand exceeding the demand. If work outside regular hours can meet increasing demand, the cost of stocking is not tolerated. In this case, however, workers are paid a fee above normal.

6-) Costs of Receiving, Training and Overworking of New Workers: Instead of prolonging the working period, new workers are recruited during periods when demand is high or some workers are removed in case of low demand. If this is the case, the cost of the training of new workers and the cost of taking out of the job are counted.

7-) Excessive Capacity Costs: In case of excessive demand, instead of having stocks sometimes, vacant machines are put into operation to meet demand with excess capacity. However, keeping the capacitor high may require repair maintenance and depreciation. The increase in the unit cost of production is due to the constant and varying costs of these costs compared to the cost of inventories.

8-) Customer's Kidnapping Cost: This is also called non-possession cost. In case customer requests can not be met on time and in desired amount, customers should go to the competitor firm. This leads to long term customer loss.

9-) Depreciation and Retaliation Costs: Depreciated quality of stored goods over time can lose value due to reasons such as rapid change of technology and fashion. Here, accurate demand forecasting, storage time and storage conditions are important in terms of reducing costs.

10-) Taxes and Interest Costs: The tax laws of the country may be such as to increase

the tax burden of the operator if the goods are overstocked. Since every stake in TL stands for investment, you have to think about the burden of interest payments.

11-) Storage Costs: Buildings or semi-open areas where stocks are not protected are at a cost even if the property is owned by the owner. Each unit of the storage area (or volume) can be thought of as a machine. A depot also has costs related to investment, maintenance, operation and utilization efficiency.

12-) Transportation Costs: The cost may increase when the amount of the material is reduced below the certain amount in the transportation from the production source to the depot consumption point. For example, if the quantity carried (or the order quantity) is 25% of the capacity of the transport vehicle, the unit transport cost can be very high. When determining the order size, it is also necessary to consider the capacities of transport vehicles. The availability of standard tools according to the order here provides a great cost advantage.

13-) Price Changes: It is very important to determine the stock policies in speculative and inflationary environments where prices change rapidly, while not being a normal business problem. Inventories of raw materials imported from foreign countries are carefully monitored and stock decisions are made at world prices. (Kobu, 2008: 331-333)

## **2.5. Inventory Control Methods**

In industrial enterprises, inventory items are used in production activities in many different and varying amounts. The monitoring of all of them is very difficult and complicated in practice. In other words, it is difficult to find a lot of stock in the production process, to be ready to use at the desired time, and to realize it economically. (Güneçikan, 2008: 51) There are simple control methods and computer based solution methods applied to reduce this complexity. These control methods vary according to the size of the business, the mode of production, and the variety of inventory items.

### **2.5.1. Visual Control Method**

In this control system, stocks are periodically inspected by an experienced warehouse officer. Inventory items falling below a certain level are immediately ordered. The level and amount of ordering is entirely left to the trainee's experience. Leaving the stock control function in small enterprises to an experienced warehouse clerk is a very inexpensive way of stock control. However, there are some drawbacks to the wide range of visual inspection

methods used in small manufacturing companies, retail stores, especially in food markets. These can be listed as follows;

1. There is a high probability that the order level and quantity will be left to the personal judgment of the warehouse officer.

2. If warehouse stock items are not systematically placed, the warehouse officer is more likely to be misdiagnosed.

3. If the rate of consumption, duration of supply or other factors change, it is difficult to notice this immediately. Taking necessary precautions for this is very difficult. (Kobu, 2008: 335-336)

In general, the point of error is that if the business is small, communication is easy and all processes can be easily carried out by one person. However, the smaller the company, the more likely it is that there should be a certain production plan and that all units (such as staff, warehouse personnel, sales staff, managers, etc.) have to constantly exchange data with each other.

### **2.5.2. Double-Box Method**

In this method, stocks are stored in a box with two compartments. When the first box is completely exhausted, a new order is placed. The quantity in box 2 should meet your needs until the order is received. These boxes can sometimes be thought of as a department or warehouse. (Çelikçap, 1994: 127)

Taking into consideration the changes in delivery and selling times, the sizes of the boxes must be constantly monitored in changing conditions of the day. This inventory control method is often used to control low, low volume and many inventory items. (Küçük, 2011: 60)

### **2.5.3. Fixed Order Period Method**

In this method, the quantities of stock items are determined according to a certain period. The stocks are tried to be completed by giving the order quantities which will complete the determined quantities to certain levels. (Tekin, 2009: 12)

As can be seen in Figure 1, for each of the order periods "ts", orders are placed at the amount that will bring the stocks to the predefined maximum stock level. The volume of

demand or the rate of decrease in stocks varies between periods.

In the first order period, orders have been placed up to "Q1" considering the stock level. Since the second period stocks do not decrease until the first period, they are ordered less than the previous period ( $Q_2 < Q_1$ ) and the stocks are brought to the maximum stock level. With other similar fixed periods, orders will be made in amounts that will bring the stock level to the maximum stock level and often the amounts of these orders will be different from each other. (Küçük, 2011: 70)

As a result, it can be said that the intervals between orders are determined in this method, but the amount of the order is different, for every period depending on the change in demand.

#### **2.5.4. Fixed Order Quantity Method**

In this method, when the stock goes down to a certain level, a predetermined fixed amount is ordered so as to minimize the total cost of stock. In this model, for each stock item, an order quantity (q), order level and safety stock, which makes the total stock control cost minimum, must be calculated. The fact that the consumption rate differs in each period causes the order time (ts) to vary in each period.

In this method, it can be said that the fixed order quantity should be determined to meet the existing needs.

As seen in Figure 2, the maximum-minimum inventory levels and the inventory level of the order point are predetermined. In the model, the order quantity is fixed with the speed of decrease of the stocks being different and orders are given every time "q". When stocks reach the order point level, they are ordered again and fixed amount.

In general, this method is used in the material requirement planning system, for some special stock units, and when the ordering costs are high. Set fixed order quantities are distributed over periods to meet net needs. If the net requirement at any time is more than the fixed order quantity, the order quantity is increased. (Küçük, 2011: 71-72)

#### **2.5.5. ABC Method**

They are grouped as cumulative percentages according to the quantity and value of stocks, and by monitoring stock changes of these groups. The ABC method is used for inventory control, production planning, quality control, sales and distribution.

ABC analysis is an inventory classification technique in which the items in inventory

are classified according to the dollar volume (value) generated in annual sales (Fuerst, 1981)

Inventories according to ABC method; A, B, C groups. Inventories entering Group A bring about 15-20% of annual stock amount and 70-80% of stock value.

Stocks entering group B represent 30-40% of the annual stock amount and 10-20% of the stock value. Stocks entering Group C constitute 45-55% of annual stock amount and 5-10% of stock value. (Tekin, 2009: 13)

Serious loss of sales can occur when there are no staples in group A parts. A continuous visual inspection method should be applied to segment A. In the absence of stock parts in group C, very important losses are not encountered, so stock controls are easier. Periodic oversight may be applied to these inventory items. Parts of class B are not as important as management's special attention, but not as cheap as stocks can be kept in excess. Periodic and continuous inspections can also be used in this inventory item. (Yuksel, 2010: 179)

| Stock Part | The unit cost | Monthly Sales (unit) | TL amount | Percent of TLamount | Percentage of staged | Class |
|------------|---------------|----------------------|-----------|---------------------|----------------------|-------|
| Y          | 750           | 500                  | 375000    | %74                 | %19                  | A     |
| P          | 625           | 300                  | 187500    |                     |                      |       |
| X          | 100           | 600                  | 60000     | %17                 | %34                  | B     |
| W          | 250           | 150                  | 37500     |                     |                      |       |
| S          | 50            | 700                  | 35000     |                     |                      |       |
| I          | 40            | 600                  | 24000     | %9                  | %47                  | C     |
| K          | 50            | 400                  | 20000     |                     |                      |       |
| R          | 20            | 1000                 | 20000     |                     |                      |       |

Figure 3. Classification of Stock Parts According to ABC Method

Source: Yüksel, H., (2010), Production / Operations Management, Nobel Publications, Ankara p.179

As can be seen in Table 1.1, Group A corresponds to 74% of total value of stocks, and these stocks occupy 19% of total stock. The value of B group stocks is 15%, the stock area is 34%, the stock value of C group is 9% and the area covered by them is 47%.

Group A, which has a high TL value, represents the group whose stocks are to be continuously monitored.

### **2.5.6. Computerized Control**

Inventory control can be done much more quickly and safely in the case of computer use in enterprises. When information about material exits is processed in the computer, the material that falls below the minimum stock level is also automatically removed. Based on these, a list showing the missing quantities is prepared and sent to the purchasing service for the necessary orders. This information can be easily identified in the light stock levels. Especially in large stores with computer systems suitable for bar code (line code) technology, counting of goods is not regarded as a problem. (Kaya, 2004: 25)

Barcode System: It is a system that identifies products with computers with optical readers. It is an automatic identification data collection system for tracking stocks. Generally, the stock code information of the goods is identified with barcode symbols and the information is transferred to the hosts through the decoders. If stock is demanded or goods are output, bar code label on the goods is deducted from stock.

Benefits of the barcode system;

1. Fast, reliable and practical.
2. Provides control of goods, reduces the cost of accounting for interrupted invoices, and enhances the financial structure of the entity by avoiding the cost of unnecessary inventories.
3. Since the warehouse is located on the computer where the goods are located, the warehouse finds where the goods are located.
4. With this program, it is provided to determine the goods that arrive at the minimum inventory level, to prepare the order lists, and to monitor the goods movements.

For the same event, portable type readers can be used instead of fixed bar code readers. These are programmable readers that are portable, non-heavy, and have memory

on them. Portable readers are the reason for preference when the reader needs to be active, such as inventory counting.

Each product has a variety of features depending on its location and use, and these properties can vary in quality and quantity. Nowadays, to follow this diversity with classical control systems leads to faults and costs. Developing barcoded stock tracking systems have reduced these costs and aimed to save unnecessary time spent on stock follow-up.

With regard to current developments, intelligent stock tracking systems can be mentioned with regard to inventory control; the product lists of the company, the lists of the companies that have been worked on can be uploaded to these programs. These barcode-backed systems can easily record inventory entry and exit procedures. Moreover, thanks to these programs, which can be easily monitored by all the movements, the products in stock, the products in critical level, the products that have not been processed until today, the products that are most traded or the products that are sold the most easily are seen and help to develop different strategies on products without any difficulties .

## CHAPTER 3

### INVENTORY MANAGEMENT IN THE CONTEXT OF MARKETING CASE

#### 3.1. Importance of Inventory Management in the Market and Its Importance

It is the whole of the systems that enable the delivery of the products and services that match the expectations of the marketing, the institution and the customer at the desired place and time, at the desired price and on the desired conditions. (Mucuk, 1991) By definition, marketing is the planning and implementation process for the development, pricing, promotion and dissemination of ideas, goods and services in order to fulfill the responsibilities of achieving personal and organizational goals. According to this definition, there are four basic elements in classical marketing understanding. These elements, known as Marketing's 4P, are decisions about the product, decisions about the price, decisions about the promotion and decisions about distribution.

Inventory Management is the whole of the decisions taken regarding stocks in order to ensure the optimum level of the products supplied by a company. The concept of inventory management has a broad meaning and includes issues such as stock control, supply planning, demand forecasting, inventory cost.

For a starter, it is first necessary to define the term of "stocks". Material, semi-finished or finished products to be used or marketed in the future are defined as inventories in the literature of the business enterprise. (Demir ve Gümüšođlu, 1994) The concept of stock being processed in more detail in other parts of the thesis is an issue that is on the agenda in all the operations and business processes of the operator. (Tanyaş ve Baskak, 2006)

Inventory control is defined as the processes that ensure that raw materials, materials, spare parts and ready-made products are kept running without any incomplete, excessive, but sufficient amount of production and marketing activities. In other words, the purpose of inventory control is to find answers to two questions about "when" and "how much" to supply for production or marketing, and sales.



Inventory management and marketing are all related to each other. This relationship can sometimes be in the form of a conflict of mutual interests and sometimes conflicting goals. As the activities related to inventory management are wide and multifaceted, other sections of the business such as production, accounting-finance, purchasing department are also in the interest of marketing department. However, there are differences between departments in terms of the objectives of inventory management. The production and marketing departments want to follow production orders and orders, while the purchasing department wants to monitor the high stock level and non-frequent ordering policy in order to reduce administrative burden and reduce transportation costs. However, the finance and accounting departments are opposed to this investment in order to reduce investment in stocks. The money connected to stocks for the finance department is an idle resource and can not be evaluated elsewhere for the time being. The indispensable condition of good stock management, especially balancing the conflicting demands of operating in cooperation with the marketing department, is to specify policies that take account of the interests of the entire company. (Top , 2006)

### **3.2. Inventory Management Relationship**

#### **3.2.1. Product and Inventory Management Relationships**

Stocks stocked in enterprises are either ready-made products or raw materials that directly affect production and are semi-finished goods. Therefore, any kind of decision taken regarding the stock will affect the product and it also concerns marketing. With a start-up, stock management involves the most management decisions that affect or affect the product. For example; While it is necessary to make different decisions for long-lasting and durable products with long shelf life, it may be necessary to make different decisions for products that have short shelf life or have a risk of deterioration. These decisions and the specific situation of the product directly affect the reaction rate of the marketing department.

The overall sales course of the product, whether it is fast consumable, high volume, whether it is difficult to transport or not, are factors that affect the inventory management decisions. This situation can sometimes cause conflicts and conflicts with the marketing department. While the marketing department always wants to have products available for sale, the stock management department may not supply as many products as needed to optimize the limited storage space. Since a product that takes up a lot of space is stolen from the area of other products, despite the demand of the marketing department, the stock

management cannot provide this product but prefer to bring it on order. Even this element is a factor that needs to be considered by the sales team in the marketing department.

In addition, different approaches should be applied for the products specific to one time. For example; a daily newspaper, only belongs to the day concerned, is unique and private, can not be created again. There are special decision making systems for stock management of such products. As another case; daily milk, such as shelf life of one day, the life course is very short products are evaluated within this scope. For example, decisions regarding blood products, seafood, some foods and similar products vary. For such products in stock management, systems called "single-term stock models ürün are applied. The decision maker has to make the inventory planning as one-period. Because at the end of the period, the remaining stocks remain unavailable. The decision maker can only order once. If there are too many products in the stocks, the remaining products will not be of value and will be damaged. (Ulucan,2004) On the other hand, if there is less product in stocks, loss of opportunity and customer loss will be faced. In this case there are various mathematical models and formulas in stock management to determine the best order quantity.

The overall life cycle of the product is also an issue that stock management and marketing departments must consider together. As is known, each product has a life cycle, new products are developed (developed), grows (market share increases) and dies (withdrawn from the market). Inventory decisions should be shaped in accordance with the life course of the product coming from the marketing department. The product life cycle may be several years for some goods, while for others it may be as short as a few months or several weeks. Especially electronics and high technology products are examples of this type. In order to avoid this situation, the course should be monitored well and the marketing department should make a faster decision as it will cause great damage.

### **3.2.2. .The Relationship Between Inventory Cost and Inventory Management**

The price in marketing is the monetary value that is paid to obtain a product or service in the most basic sense. For the customer, the price is the amount he / she is willing to pay to have the desired product. Although there are many factors affecting the pricing decisions, one of the most important factors affecting the pricing of a product is the total cost of ownership of the product. Stock costs also have a significant place in the product cost. Even in some cases, inventory costs can reach up to 20 var25% of the total annual value of the product. (Tek, 1984) This is a factor affecting the product price. If stock costs

can be minimized, or at least optimally maintained, they can have a great competitive advantage in marketing, as this will also affect the price offered to the end consumer.

One of the main objectives of inventory management is to create a stock model that minimizes total inventory costs. The more successful this goal is, the more it is saved, and this margin can either be used by the marketing management to serve the competitive purpose by keeping the final price of the product low, or to increase profitability and direct it to other sources.

One of the issues that are most related to inventory management and marketing pricing is quantity discounts. In order to promote the purchase of a certain amount of products, quantity discounts are applied. The stock management and marketing unit makes a decision that does not increase the stocking costs by making a common decision, allowing the marketing to take advantage of the discount on which it can offer a better price and competitive advantage. Since the unit cost of the product received as a result of the discount will be reduced, this can be reflected in the final sale price or the profit can be increased by not changing the price; these decisions are at the disposal of the marketing department.

While making the pricing decisions in marketing management, determining the end user price of the product sometimes makes the main company, sometimes it is left to the pricing market channel. This may result in different pricing, such as supplier prices, dealer prices, and retailer prices. Alternative pricing strategies, such as on-site pricing, geographic pricing, may occur. The pricing decisions to be made by these actors may vary depending on whether they are stocked or not. Agents entering an intense stock of goods can influence the price of the product if they have the power to change the supply balance in the market. Even such distributors can sometimes offer even more advantageous price than the main producer's ex-factory, and sometimes they can price the products in their stocks well above market value when the product is not in the market. Businesses who want to follow a stable pricing strategy in the market have to manage their stocks as well as the stocks of the actors in the lower levels of the distribution chains.

### **3.2.3. Relation of Inventory Level to Market**

As it is known in the promotion mix, activities such as personal sales, sales development elements, advertising, public relations and publicity activities are included. In relation to each of these elements, stock management has interaction in various

dimensions. It is an important condition for the efforts of a consumer to reach the product quickly and to find a product when he / she wants to reach a concrete result.

If the relationship of stock management with personal sales is mentioned; selling the goods in stock is always a source of trust and motivation for the salesperson. There is a huge difference in terms of personal sales between buying a non-stock product and selling a stock. Existing stocks provide impetus for salespersons, because the end result of sales efforts is only through the delivery of the goods, so salespeople first try to dissolve existing products in stock. Even the availability of the product can be used as a competitive element or a sales closure element in a sales call.

One of the components of the promotion is the sales management efforts aimed at selling. These sales development efforts, which are mentioned as sales promotion in English, are not promoted as a promotion but are promoted as promotion. These promotional activities, in which promotional products, payment or price advantages are offered, are carried out at various stages of the product life cycle. However, in many cases, the most important factor affecting the decision of when such activities will be made for products is the stock status of the products. It can be said that such sales developer efforts are made more for the products that are in stock for a period, which are more than stock. In addition, sales incentive efforts can be used more intensively to reduce the stock of shelf-life or out-of-date products to melt the stock at the season changes. This situation requires the marketing department to have close follow-up relationship with stock management. For example, many "end-of-season inventories" are planned to be related to the campaign stock cycle, which is the motto of many sales development. In addition, many goods that are not sold separately but sometimes as a gift with another product as a package (bundle) can be composed of products accumulated in stocks. With these studies, idle inventories are offered as a sales developer material, while contributing to the sale of other products as well as providing a positive perception to the firm in terms of the consumer as well as providing inefficient resources.

Targeted sales are another area where sales development efforts are related to inventory. When a certain amount of product is received, product sales can be encouraged by making certain amounts of goods, gifts, reimbursements or similar promotions.

Thanks to good and efficient inventory management, some companies can increase their sales by supporting their dealers. For example, Arena, which operates in the technology sector, keeps thousands of products in its own stocks, and when it arrives, it delivers within one day in the city and in one day in different cities. Thus, dealers are able

to offer thousands of kinds of products without the need for stocking. Even with computer aided and online stock integration programs, dealers can see the stocks of the main supplier simultaneously and sell them as if they were their own stocks.

Inventory management can also be used as an advertising element. The message "Product is in stock" is an effective message that can also be used in ads. The slogan of "New products in stocks", which does not want to wait, is aimed at customers who want to buy the product from stock, is often used for attracting attention and news.

#### **3.2.4. Distribution of Marketing Components and Inventory Management**

The phenomenon of distribution in marketing and stock management are completely interrelated to one another in an intertwined manner that will be an integral part of each other. Distribution is one of the most important functions of marketing because it is a function in which the final result of all marketing efforts will be taken. Distribution is the process of delivering the products produced to the target points and covering the delivery to the customer. The functions included in the distribution sub-mix include the spatial and material dimensions of all marketing activities and other 3Ps. The distribution covers the delivery of appropriate products to the buyers at appropriate times and places at appropriate times and the persons, institutions, establishments, places, vehicles and activities within and outside the organization.

Inventory management decisions and variables are at the forefront at every stage of the distribution chain. Especially in intermediate stages of distribution network, stocks of suppliers, distributor stocks, retail stocks can be stocked at different stages, and all of these variables such as stock accumulation, which will not be in stock, and in what direction the stocks will flow are all related to marketing. Sometimes the parent company may choose a policy to stock the end user by pushing their stocks towards the end user. Alternatively, when full-time delivery systems are used, the delivery decisions of the distributor and supplier can be shaped as needed and the order is passed. Since all these different situations are factors that affect the speed of the product's arrival and the time of supply, the distribution function and stock management are closely related. The main firm, the decision to make stockings at branches or in different enterprises and the decisions on how to proceed are always related to stock management. Especially in terms of supply chain management, the importance of this issue becomes more apparent.

At this point, it is necessary to give a definition of the concept of supply chain. The

supply chain is a network of service and distribution options, which technically fulfill material supply processes, convert them into semi-finished products and then deliver them to customers through the distribution channel. Supply chain management is an activity covering the control and coordination of all material and information flows (upstream, input and downstream) and downstream (downstream, distribution and post-marketing services) in the chain, which takes place until the raw material is delivered to the end user (Eymen, 2008).

All the elements within the supply chain are considered as separate firms and customers. Figure 1 shows the stock areas within a supply chain. As can be seen from the first supplier to the final consumer decision can be stocked at all levels of the chain. One of the most important decisions of marketing management is to determine how the stocks will be distributed and structured in coordination with the inventory management, as these inventories will have a great impact on sales and distribution rate. For example, if the brokerage business can handle a large amount of stock itself, marketing management will then decide on a distribution decision, and perhaps encourage the broker to keep more stock, thus reducing the cost of distribution and operation.



## CHAPTER 4

### 4. Stock Management Application From The Industry

#### 4.1:Regression and statistical models

Inventory level can be significant to effect number of item are sold.In Market many companies try to impress their customers by different ways.Some of them highlight their product's speciality or how this product is distinguished from others by their quality.Some of them put a single product in glass basket to show that having that product make you privileged.In this chapter,results are examined by increasing inventory level to see if this effects sales positively or not.

The model is used is regression model.There is one independent variable and one dependent variable in that model.Independent variable is level of inventory and dependent variable is number of item that is sold.Relationship between those two are examined and try to observe how much change of inventory level can cause more sales.

$$Y=a+bx.$$

$$Y=\text{Number of item sold.}$$

$$X=\text{Inventory level}$$

$$A=\text{Intercept of Model}$$

$$B=\text{Slope of the model.}$$

#### 4.2. Adana Optimum

In Adana's stores 5 products are examined.First relationship between sales and inventory level are observed.Then inventory level is increased to see if number of unit sold give reaction to change of inventory level.



#### 4.2.1. Socks product

Inventory level and sales numbers are shown by table 1 for socks products for Adana 's stores. Datas are obtained week by week. Inventory level is measured at the beginning of the week. Sales numbers are the total sales number during that week.

**Table 1:** Adana Optimum store's sock's sales and Inventory level

| Weeks | sales | inv.lvl | Order | Cumulative sales | Cumulative inv.lvl | sales change % | inv.lvl change |
|-------|-------|---------|-------|------------------|--------------------|----------------|----------------|
| 1     | 10    | 20      | 0     | 10               | 20                 | -              | -              |
| 2     | 8     | 10      | 0     | 18               | 30                 | -0,2           | -0,5           |
| 3     | 12    | 22      | 20    | 30               | 52                 | 0,5            | 1,2            |
| 4     | 6     | 10      | 0     | 36               | 62                 | -0,5           | -0,545454545   |
| 5     | 13    | 24      | 20    | 49               | 86                 | 1,166666667    | 1,4            |
| 6     | 8     | 11      | 0     | 57               | 97                 | -0,384615385   | -0,541666667   |
| 7     | 12    | 23      | 20    | 69               | 120                | 0,5            | 1,090909091    |
| 8     | 7     | 11      | 0     | 76               | 131                | -0,416666667   | -0,52173913    |
| 9     | 14    | 24      | 20    | 90               | 155                | 1              | 1,181818182    |
| 10    | 12    | 20      | 10    | 102              | 175                | -0,142857143   | -0,166666667   |
| 11    | 13    | 28      | 20    | 115              | 203                | 0,083333333    | 0,4            |
| 12    | 16    | 35      | 20    | 131              | 238                | 0,230769231    | 0,25           |
| 13    | 10    | 19      | 0     | 141              | 257                | -0,375         | -0,457142857   |
| 14    | 17    | 34      | 25    | 158              | 291                | 0,7            | 0,789473684    |
| 15    | 11    | 17      | 0     | 169              | 308                | -0,352941176   | -0,5           |
| 16    | 19    | 36      | 30    | 188              | 344                | 0,727272727    | 1,117647059    |
| 17    | 11    | 17      | 0     | 199              | 361                | -0,421052632   | -0,527777778   |
| 18    | 8     | 16      | 10    | 207              | 377                | -0,272727273   | -0,058823529   |
| 19    | 4     | 8       | 0     | 211              | 385                | -0,5           | -0,5           |
| 20    | 13    | 24      | 20    | 224              | 409                | 2,25           | 2              |
| 21    | 6     | 11      | 0     | 230              | 420                | -0,538461538   | -0,541666667   |
| 22    | 18    | 30      | 25    | 248              | 450                | 2              | 1,727272727    |
| 23    | 19    | 32      | 20    | 267              | 482                | 0,055555556    | 0,066666667    |
| 24    | 11    | 23      | 10    | 278              | 505                | -0,421052632   | -0,28125       |
| 25    | 6     | 12      | 0     | 284              | 517                | -0,454545455   | -0,47826087    |
| 26    | 4     | 6       | 0     | 288              | 523                | -0,333333333   | -0,5           |
| 27    | 2     | 2       | 0     | 290              | 525                | -0,5           | -0,666666667   |

**Table 2:Regression of sock's sales change % and Inventory level change %**

| <i>Regression Statistics</i> |             |
|------------------------------|-------------|
| Multiple R                   | 0,955314234 |
| R Square                     | 0,912625286 |
| Adjusted R Square            | 0,908984673 |
| Standart Error               | 0,233646156 |
| Observations                 | 26          |

| ANOVA      |           |             |             |             |                     |
|------------|-----------|-------------|-------------|-------------|---------------------|
|            | <i>df</i> | <i>SS</i>   | <i>MS</i>   | <i>F</i>    | <i>Significance</i> |
| Regression | 1         | 13,68469903 | 13,68469903 | 250,6790097 | 3,3282E-14          |
| Residual   | 24        | 1,310172627 | 0,054590526 |             |                     |
| Total      | 25        | 14,99487166 |             |             |                     |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | -0,019090582        | 0,046789315           | -0,408011564  | 0,68688231     | 0,115658981      | 0,077477818      |
| X1 variable | 0,878293318         | 0,055472865           | 15,83284591   | 3,3282E-14     | 0,763802952      | 0,992783683      |

According to the results in Table 2, there is a statistically significant relationship between sales and stock ( $p < 0.05$ ). There is a high degree of relationship between variables ( $R = 0.95$ ). The specificity coefficient  $R^2$  is found to be 0.91, and it can be said that 91% of the changes in sales depend on the change in inventory level. According to the result of F statistic in which the general significance of the model was evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is observed that the 1-branch changes in the inventory level will cause a change of 0.87 bn in the sales. As a result of the inventory level change, T-Test is conducted to determine whether there is a difference between old sales and new sales averages. The hypotheses to be established are as follows:

H0: There is no significant difference between old sales averages and new sales averages.

H1: There is a meaningful difference between the old sales averages and the new sales averages.

The t-test results are shown in the following table:

**Table 3:** Results of t-Test on Sales of Adana Optimum Store Sock Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 17,22222222      | 10,74074074      |
| Variance            | 33,56410256      | 21,50712251      |
| Observation         | 27               | 27               |
| Pearson Correlation | 0,9584834        |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 26               |                  |
| t Stat              | 17,83230815      |                  |
| P(T<=t) one tail    | 2,11151E-16      |                  |
| t critical one tail | 1,70561792       |                  |
| P(T<=t) two tail    | 4,22302E-16      |                  |
| t critical two tail | 2,055529439      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### 4.2.2. Shoes product

Inventory level and sales numbers are shown by table 4 for shoes products for Adana 's stores. Datas are obtained week by week. Inventory level is measured at the beginning of the week. Sales numbers are the total sales number during that week

**Table 4:** Adana Optimum store's shoes's sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 132   | 457     | 132       | 457         | -              | -                |
|       | 195   | 325     | 327       | 782         | 1,477272727    | 0,711159737      |
|       | 114   | 130     | 441       | 912         | 0,348623853    | 0,166240409      |
|       | 133   | 16      | 574       | 928         | 0,301587302    | 0,01754386       |
| 600   | 180   | 483     | 754       | 1411        | 0,31358885     | 0,520474138      |
|       | 192   | 303     | 946       | 1714        | 0,25464191     | 0,214741318      |
| 400   | 193   | 511     | 1139      | 2225        | 0,204016913    | 0,298133022      |
|       | 161   | 318     | 1300      | 2543        | 0,141352063    | 0,142921348      |
| 400   | 187   | 557     | 1487      | 3100        | 0,143846154    | 0,219032639      |
|       | 111   | 370     | 1598      | 3470        | 0,07464694     | 0,119354839      |
|       | 128   | 259     | 1726      | 3729        | 0,080100125    | 0,074639769      |
| 600   | 182   | 731     | 1908      | 4460        | 0,105446118    | 0,196031108      |
|       | 106   | 549     | 2014      | 5009        | 0,055555556    | 0,12309417       |
|       | 199   | 443     | 2213      | 5452        | 0,098808342    | 0,088440807      |
| 600   | 199   | 844     | 2412      | 6296        | 0,089923181    | 0,154805576      |
|       | 118   | 645     | 2530      | 6941        | 0,048922056    | 0,102445997      |
|       | 185   | 527     | 2715      | 7468        | 0,07312253     | 0,075925659      |
|       | 130   | 342     | 2845      | 7810        | 0,047882136    | 0,045795394      |
| 600   | 165   | 812     | 3010      | 8622        | 0,057996485    | 0,10396927       |
|       | 141   | 647     | 3151      | 9269        | 0,046843854    | 0,075040594      |
|       | 184   | 506     | 3335      | 9775        | 0,058394161    | 0,054590571      |
| 600   | 115   | 922     | 3450      | 10697       | 0,034482759    | 0,094322251      |
|       | 107   | 807     | 3557      | 11504       | 0,031014493    | 0,075441713      |
|       | 166   | 700     | 3723      | 12204       | 0,046668541    | 0,060848401      |
|       | 169   | 534     | 3892      | 12738       | 0,0453935      | 0,043756146      |
|       | 109   | 365     | 4001      | 13103       | 0,028006166    | 0,02865442       |
|       | 134   | 256     | 4135      | 13359       | 0,033491627    | 0,01953751       |
| 600   | 125   | 722     | 4260      | 14081       | 0,030229746    | 0,054045962      |
|       | 166   | 597     | 4426      | 14678       | 0,038967136    | 0,042397557      |
|       | 129   | 431     | 4555      | 15109       | 0,029145956    | 0,029363674      |
|       | 152   | 302     | 4707      | 15411       | 0,033369923    | 0,019988087      |
|       | 148   | 150     | 4855      | 15561       | 0,031442532    | 0,009733307      |

**Table 5:Regression of shoes's sales change % and Inventory level change %**

| <i>Regression Statistics</i> |             |
|------------------------------|-------------|
| Multiple R                   | 0,833975234 |
| R Square                     | 0,695514692 |
| Adjusted R Square            | 0,685365181 |
| Standart Error               | 0,146064153 |
| Observations                 | 32          |

| ANOVA      |           |             |           |          |                     |
|------------|-----------|-------------|-----------|----------|---------------------|
|            | <i>df</i> | <i>SS</i>   | <i>MS</i> | <i>F</i> | <i>Significance</i> |
| Regression | 1         | 1,462003821 | 1,462004  | 68,52692 | 3,06436E-09         |
| Residual   | 30        | 0,6400421   | 0,021335  |          |                     |
| Total      | 31        | 2,102045921 |           |          |                     |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,043342389         | 0,033922134           | -1,2777       | 0,211154       | 0,112620628      | 0,02593585       |
| X1 variable | 1,463312572         | 0,176769158           | 8,278099      | 3,06E-09       | 1,102301789      | 1,824323355      |

According to the results in Table 5, there is a statistically significant relationship between sales and stock ( $p < 0.05$ ). There is a high degree of relationship between variables ( $R = 0.69$ ). The specificity coefficient  $R^2$  was found to be 0.68, and it can be said that 68% of the changes in sales depend on the change in stock amount. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branche changes in the stock will cause a change of 1,46 branche in sales.

**Table 6: Results of t-Test on Sales of Adana Optimum Store Shoe Product**

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 242,75           | 151,71875        |
| Variance            | 2533,447742      | 989,6280242      |
| Observation         | 32               | 32               |
| Pearson Correlation | 1                |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 31               |                  |
| t Stat              | 27,28212865      |                  |
| P(T<=t) one tail    | 1,54611E-23      |                  |
| t critical one tail | 1,695518783      |                  |
| P(T<=t) two tail    | 3,09222E-23      |                  |
| t critical two tail | 2,039513446      |                  |

The value is 0,000.  $H_0$  hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages.

### 4.2.3 T-shirt Product

Inventory level and sales numbers are shown by table 7 for shoes products for Adana 's stores. Datas are obtained week by week. Inventory level is measured at the beginning of the week. Sales numbers are the total sales number during that week.

**Table 7:** Adana Optimum store's T-shirt's sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 246   | 574     | 293       | 328         |                |                  |
|       | 293   | 328     | 575       | 1163        | 0,962457338    | 2,545732         |
| 800   | 282   | 835     | 816       | 1716        | 0,419130435    | 0,475494         |
|       | 241   | 553     | 1044      | 2028        | 0,279411765    | 0,181818         |
|       | 228   | 312     | 1333      | 2912        | 0,276819923    | 0,435897         |
| 800   | 289   | 884     | 1554      | 3507        | 0,165791448    | 0,204327         |
|       | 221   | 595     | 1764      | 3881        | 0,135135135    | 0,106644         |
|       | 210   | 374     | 2056      | 4845        | 0,16553288     | 0,24839          |
| 800   | 292   | 964     | 2258      | 5517        | 0,098249027    | 0,1387           |
|       | 202   | 672     | 2491      | 5987        | 0,103188663    | 0,085191         |
|       | 233   | 470     | 2773      | 7024        | 0,113207547    | 0,173209         |
| 800   | 282   | 1037    | 3015      | 7779        | 0,087270105    | 0,107489         |
|       | 242   | 755     | 3258      | 8292        | 0,080597015    | 0,065947         |
|       | 243   | 513     | 3461      | 8562        | 0,062308165    | 0,032562         |
|       | 203   | 270     | 3738      | 9429        | 0,080034672    | 0,101261         |
| 800   | 277   | 867     | 4027      | 10019       | 0,077314072    | 0,062573         |
|       | 289   | 590     | 4314      | 10320       | 0,071268935    | 0,030043         |
|       | 287   | 301     | 4598      | 10334       | 0,065832174    | 0,001357         |
|       | 284   | 14      | 4849      | 10864       | 0,054588952    | 0,051287         |
| 800   | 251   | 530     | 5063      | 11143       | 0,044132811    | 0,025681         |
|       | 214   | 279     | 5344      | 12008       | 0,055500691    | 0,077627         |
| 800   | 281   | 865     | 5621      | 12592       | 0,051833832    | 0,048634         |
|       | 277   | 584     | 5882      | 12899       | 0,046433019    | 0,024381         |
|       | 261   | 307     | 6091      | 13745       | 0,035532132    | 0,065586         |
| 800   | 209   | 846     | 6332      | 14382       | 0,039566574    | 0,046344         |
|       | 241   | 637     | 6615      | 14778       | 0,04469362     | 0,027534         |
|       | 283   | 396     | 6901      | 14891       | 0,043235072    | 0,007647         |
|       | 286   | 113     | 7140      | 15518       | 0,034632662    | 0,042106         |
| 800   | 239   | 627     | 7416      | 15906       | 0,038655462    | 0,025003         |
|       | 276   | 388     | 7652      | 16018       | 0,031823085    | 0,007041         |
|       | 236   | 112     | 7868      | 16694       | 0,028227914    | 0,042203         |
| 800   | 216   | 676     | 8077      | 17154       | 0,026563294    | 0,027555         |

**Table 8:Regression of T-shirt's sales change % and Inventory level change %**

| <i>Regression Statistics</i> |             |
|------------------------------|-------------|
| Multiple R                   | 0,957102512 |
| R Square                     | 0,916045218 |
| Adjusted R Square            | 0,913150226 |
| Standart Error               | 0,052636637 |
| Observations                 | 31          |

| ANOVA      |           |             |           |          |                     |
|------------|-----------|-------------|-----------|----------|---------------------|
|            | <i>df</i> | <i>SS</i>   | <i>MS</i> | <i>F</i> | <i>Significance</i> |
| Regression | 1         | 0,876689385 | 0,876689  | 316,424  | 3,83198E-17         |
| Residual   | 29        | 0,080347852 | 0,002771  |          |                     |
| Total      | 30        | 0,957037237 |           |          |                     |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,056164892         | 0,010177085           | 5,51876       | 6,01E-06       | 0,035350415      | 0,076979368      |
| X1 variable | 0,376746708         | 0,021179452           | 17,78831      | 3,83E-17       | 0,333429864      | 0,420063552      |

According to the results in Table 8, there is a statistically significant relationship between sales and stock ( $p < 0.05$ ). There is a high degree of relationship between variables ( $R = 0.95$ ). The specificity coefficient  $R^2$  is found to be 0.91, and it can be said that 91% of the changes in sales depend on the change in stock amount. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branche changes in the stock will cause a change of 0,37 branche in sales.

**Table 9: Results of t-Test on Sales of Adana Optimum Store T-shirt Product**

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 380,34375        | 253,5625         |
| Variance            | 2096,990927      | 931,995968       |
| Observation         | 32               | 32               |
| Pearson Correlation | 1                |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 31               |                  |
| t Stat              | 46,9843256       |                  |
| P(T<=t) one tail    | 1,1124E-30       |                  |
| t critical one tail | 1,695518783      |                  |
| P(T<=t) two tail    | 2,2248E-30       |                  |
| t critical two tail | 2,039513446      |                  |

The value is 0,000.  $H_0$  hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### 4.2.4.Hoodie Product

Inventory level and sales numbers are shown by table 10 for T-shirt products for Adana 's stores.Datas are obtained week by week.Inventory level is measured at the begining of the week.Sales numbers are the total sales number during that week.

**Table 10:** Adana Optimum store's Hoodie's sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 129   | 312     | 129       | 312         |                |                  |
| 104   | 153   | 287     | 282       | 599         | 1,186046512    | 0,919872         |
| 132   | 129   | 266     | 411       | 865         | 0,457446809    | 0,444073         |
| 183   | 154   | 320     | 565       | 1185        | 0,374695864    | 0,369942         |
| 101   | 127   | 267     | 692       | 1452        | 0,224778761    | 0,225316         |
| 157   | 157   | 297     | 849       | 1749        | 0,226878613    | 0,204545         |
| 161   | 153   | 301     | 1002      | 2050        | 0,180212014    | 0,172098         |
| 125   | 148   | 273     | 1150      | 2323        | 0,147704591    | 0,133171         |
| 161   | 143   | 286     | 1293      | 2609        | 0,124347826    | 0,123117         |
| 163   | 145   | 306     | 1438      | 2915        | 0,112142305    | 0,117286         |
| 107   | 138   | 268     | 1576      | 3183        | 0,09596662     | 0,091938         |
| 182   | 130   | 312     | 1706      | 3495        | 0,08248731     | 0,098021         |
| 109   | 151   | 291     | 1857      | 3786        | 0,088511137    | 0,083262         |
| 137   | 141   | 277     | 1998      | 4063        | 0,075928918    | 0,073164         |
| 172   | 125   | 308     | 2123      | 4371        | 0,062562563    | 0,075806         |
| 120   | 139   | 303     | 2262      | 4674        | 0,065473387    | 0,069321         |
| 105   | 150   | 269     | 2412      | 4943        | 0,066312997    | 0,057552         |
| 157   | 133   | 276     | 2545      | 5219        | 0,055140962    | 0,055837         |
| 164   | 157   | 307     | 2702      | 5526        | 0,061689587    | 0,058824         |
| 151   | 127   | 301     | 2829      | 5827        | 0,047002221    | 0,05447          |
| 122   | 129   | 296     | 2958      | 6123        | 0,045599152    | 0,050798         |
| 119   | 123   | 286     | 3081      | 6409        | 0,04158215     | 0,046709         |
| 113   | 132   | 276     | 3213      | 6685        | 0,042843233    | 0,043064         |
| 126   | 139   | 270     | 3352      | 6955        | 0,043261749    | 0,040389         |
| 133   | 145   | 264     | 3497      | 7219        | 0,043257757    | 0,037958         |
| 160   | 137   | 279     | 3634      | 7498        | 0,039176437    | 0,038648         |
| 171   | 141   | 313     | 3775      | 7811        | 0,03880022     | 0,041744         |
| 107   | 130   | 279     | 3905      | 8090        | 0,034437086    | 0,035719         |
| 112   | 148   | 261     | 4053      | 8351        | 0,037900128    | 0,032262         |
| 158   | 136   | 271     | 4189      | 8622        | 0,033555391    | 0,032451         |
| 131   | 152   | 266     | 4341      | 8888        | 0,03628551     | 0,030851         |
| 194   | 136   | 308     | 4477      | 9196        | 0,031329187    | 0,034653         |
| 143   | 136   | 315     | 4613      | 9511        | 0,030377485    | 0,034254         |
| 100   | 131   | 279     | 4744      | 9790        | 0,028398006    | 0,029334         |



**Table 11:Regression of Hoodie’s sales change % and Inventory level change %**

| <i>Regression Statistics</i> |             |  |  |  |  |  |
|------------------------------|-------------|--|--|--|--|--|
| Multiple R                   | 0,993765484 |  |  |  |  |  |
| R Square                     | 0,987569837 |  |  |  |  |  |
| Adjusted R Square            | 0,987168864 |  |  |  |  |  |
| Standart Error               | 0,024209408 |  |  |  |  |  |
| Observations                 | 33          |  |  |  |  |  |

| <i>ANOVA</i> |           |            |           |          |                     |  |
|--------------|-----------|------------|-----------|----------|---------------------|--|
|              | <i>df</i> | <i>SS</i>  | <i>MS</i> | <i>F</i> | <i>Significance</i> |  |
| Regression   | 1         | 1,44351407 | 1,443514  | 2462,934 | 4,1658E-31          |  |
| Residual     | 31        | 0,01816896 | 0,000586  |          |                     |  |
| Total        | 32        | 1,46168303 |           |          |                     |  |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,018712163         | 0,0051612             | -3,62554      | 0,001022       | 0,029238509      | 0,008185816      |
| X1 variable | 1,233335795         | 0,02485164            | 49,62795      | 4,17E-31       | 1,182650549      | 1,284021041      |

According to the results in Table 11, there is a statistically significant relationship between sales and stock ( $p < 0.05$ ). There is a high degree of relationship between variables ( $R = 0.99$ ). The specificity coefficient  $R^2$  is found to be 0.98, and it can be said that 98% of the changes in sales depend on the inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the Inventory level will cause a change of 1,233 branche in sales.

**Table 12:** Results of t-Test on Sales of Adana Optimum Store Hoodie Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 171,6211765      | 139,529412       |
| Variance            | 152,686938       | 100,923351       |
| Observation         | 34               | 34               |
| Pearson Correlation | 1                |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 33               |                  |
| t Stat              | 80,98589581      |                  |
| P(T<=t) one tail    | 7,61021E-40      |                  |
| t critical one tail | 1,692360309      |                  |
| P(T<=t) two tail    | 1,52204E-39      |                  |
| t critical two tail | 2,034515297      |                  |

The value is 0,000.  $H_0$  hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### 4.2.5 Short Product

Inventory level and sales numbers are shown by table 13 for S products for Adana 's stores. Datas are obtained week by week. Inventory level is measured at the beginning of the week. Sales numbers are the total sales number during that week.

**Table 13:** Adana Optimum store's short's sales and Inventory level.

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 269   | 379     | 269       | 379         |                |                  |
| 270   | 245   | 380     | 514       | 759         | 0,910780669    | 1,002639         |
| 223   | 234   | 358     | 748       | 1117        | 0,455252918    | 0,471673         |
| 236   | 230   | 360     | 978       | 1477        | 0,307486631    | 0,322292         |
| 218   | 278   | 348     | 1256      | 1825        | 0,284253579    | 0,235613         |
| 257   | 260   | 327     | 1516      | 2152        | 0,207006369    | 0,179178         |
| 244   | 262   | 311     | 1778      | 2463        | 0,172823219    | 0,144517         |
| 315   | 285   | 364     | 2063      | 2827        | 0,160292463    | 0,147787         |
| 276   | 283   | 355     | 2346      | 3182        | 0,137178866    | 0,125575         |
| 241   | 282   | 313     | 2628      | 3495        | 0,120204604    | 0,098366         |
| 327   | 250   | 358     | 2878      | 3853        | 0,095129376    | 0,102432         |
| 264   | 239   | 372     | 3117      | 4225        | 0,08304378     | 0,096548         |
| 248   | 282   | 381     | 3399      | 4606        | 0,090471607    | 0,090178         |
| 259   | 237   | 358     | 3636      | 4964        | 0,06972639     | 0,077725         |
| 238   | 241   | 359     | 3877      | 5323        | 0,066281628    | 0,072321         |
| 236   | 277   | 354     | 4154      | 5677        | 0,071446995    | 0,066504         |
| 238   | 260   | 315     | 4414      | 5992        | 0,062590274    | 0,055487         |
| 299   | 287   | 354     | 4701      | 6346        | 0,06502039     | 0,059079         |
| 285   | 241   | 352     | 4942      | 6698        | 0,051265688    | 0,055468         |
| 276   | 236   | 387     | 5178      | 7085        | 0,047753946    | 0,057778         |
| 221   | 270   | 372     | 5448      | 7457        | 0,052143685    | 0,052505         |
| 229   | 271   | 331     | 5719      | 7788        | 0,049743025    | 0,044388         |
| 321   | 282   | 381     | 6001      | 8169        | 0,04930932     | 0,048921         |
| 232   | 249   | 331     | 6250      | 8500        | 0,041493084    | 0,040519         |
| 299   | 241   | 381     | 6491      | 8881        | 0,03856        | 0,044824         |
| 240   | 264   | 380     | 6755      | 9261        | 0,040671699    | 0,042788         |
| 247   | 260   | 363     | 7015      | 9624        | 0,038490007    | 0,039197         |
| 264   | 273   | 367     | 7288      | 9991        | 0,038916607    | 0,038134         |
| 253   | 253   | 347     | 7541      | 10338       | 0,034714599    | 0,034731         |
| 222   | 275   | 316     | 7816      | 10654       | 0,036467312    | 0,030567         |
| 275   | 257   | 316     | 8073      | 10970       | 0,032881269    | 0,02966          |
| 252   | 261   | 311     | 8334      | 11281       | 0,032329989    | 0,02835          |
| 334   | 236   | 384     | 8570      | 11665       | 0,028317735    | 0,03404          |

**Table 14:Regression of Short's sales change % and Inventory level change %**

| <i>Regresyon İstatistikleri</i> |             |
|---------------------------------|-------------|
| Multiple R                      | 0,995574097 |
| R Square                        | 0,991167782 |
| Adjusted R Square               | 0,990873375 |
| Standart Error                  | 0,016486796 |
| Observations                    | 32          |

| ANOVA      |           |            |           |          |                     |
|------------|-----------|------------|-----------|----------|---------------------|
|            | <i>df</i> | <i>SS</i>  | <i>MS</i> | <i>F</i> | <i>Significance</i> |
| Regression | 1         | 0,91510556 | 0,915106  | 3366,655 | 2,25223E-32         |
| Residual   | 30        | 0,00815443 | 0,000272  |          |                     |
| Total      | 31        | 0,92326    |           |          |                     |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,009515789         | 0,00352078            | 2,702751      | 0,01121        | 0,0023254        | 0,016706178      |
| X1 variable | 0,923865021         | 0,01592242            | 58,02289      | 2,25E-32       | 0,891347093      | 0,95638295       |

According to the results in Table 14, there is a statistically significant relationship between sales and stock ( $p < 0.05$ ). There is a high degree of relationship between variables ( $R = 0.99$ ). The specificity coefficient  $R^2$  is found to be 0.99, and it can be said that 99% of the changes in sales depend on the change in stock amount. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 0,923 branche in sales.

The value is 0,000.  $H_0$  hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

**Table 15:** Results of t-Test on Sales of Adana Optimum Store Short Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 312,5032258      | 260,419355       |
| Variance            | 449,6423226      | 312,251613       |
| Observation         | 31               | 31               |
| Pearson Correlation | 1                |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 30               |                  |
| t Stat              | 82,0543785       |                  |
| P(T<=t) one tail    | 3,66809E-37      |                  |
| t critical one tail | 1,697260887      |                  |
| P(T<=t) two tail    | 7,33618E-37      |                  |
| t critical two tail | 2,042272456      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

### **4.3. Ank Gordiom**

In Gordion's stores 5 products are examined. First relationship between sales and inventory level are observed. Then inventory level is increased to see if number of unit sold give reaction to change of inventory level.

#### **4.3.1 Sock product**

Inventory level and sales numbers are shown by table 16 for Sock product for Gordion 's stores. Datas are obtained week by week. Inventory level is measured at the begining of the week. Sales numbers are the total sales number during that week

**Table 16:** Ank Gordion store's Sock's sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
| 0     | 65    | 450     | 65        | 450         |                |                  |
| 400   | 100   | 385     | 165       | 835         | 1,538461538    | 0,855555556      |
| 0     | 126   | 285     | 291       | 1120        | 0,763636364    | 0,341317365      |
| 0     | 136   | 359     | 427       | 1479        | 0,467353952    | 0,320535714      |
| 200   | 207   | 423     | 634       | 1902        | 0,484777518    | 0,286004057      |
| 200   | 218   | 216     | 852       | 2118        | 0,34384858     | 0,113564669      |
| 0     | 564   | 698     | 1416      | 2816        | 0,661971831    | 0,329556185      |
| 700   | 174   | 634     | 1590      | 3450        | 0,122881356    | 0,225142045      |
| 500   | 190   | 1360    | 1780      | 4810        | 0,119496855    | 0,394202899      |
| 900   | 237   | 1170    | 2017      | 5980        | 0,133146067    | 0,243243243      |
| 0     | 226   | 933     | 2243      | 6913        | 0,112047595    | 0,156020067      |
| 0     | 233   | 1507    | 2476      | 8420        | 0,103878734    | 0,217995082      |
| 800   | 217   | 1274    | 2693      | 9694        | 0,087641357    | 0,151306413      |
| 0     | 330   | 1057    | 3023      | 10751       | 0,122539918    | 0,109036517      |
| 0     | 259   | 727     | 3282      | 11478       | 0,08567648     | 0,067621617      |
| 0     | 168   | 1368    | 3450      | 12846       | 0,0511883      | 0,119184527      |
| 900   | 196   | 1200    | 3646      | 14046       | 0,056811594    | 0,093414292      |
| 0     | 188   | 1004    | 3834      | 15050       | 0,051563357    | 0,071479425      |
| 0     | 188   | 816     | 4022      | 15866       | 0,04903495     | 0,054219269      |
| 0     | 118   | 1128    | 4140      | 16994       | 0,029338637    | 0,071095424      |
| 500   | 158   | 1010    | 4298      | 18004       | 0,038164251    | 0,059432741      |
| 0     | 95    | 1452    | 4393      | 19456       | 0,022103304    | 0,080648745      |
| 600   | 92    | 1357    | 4485      | 20813       | 0,020942408    | 0,069747122      |
| 0     | 137   | 1265    | 4622      | 22078       | 0,030546265    | 0,060779321      |
| 0     | 125   | 1128    | 4747      | 23206       | 0,027044569    | 0,051091584      |
| 0     | 109   | 1003    | 4856      | 24209       | 0,022961871    | 0,043221581      |
| 0     | 116   | 894     | 4972      | 25103       | 0,023887974    | 0,036928415      |
| 0     | 167   | 778     | 5139      | 25881       | 0,033588093    | 0,030992312      |
| 0     | 124   | 1111    | 5263      | 26992       | 0,024129208    | 0,042927244      |
| 500   | 137   | 987     | 5400      | 27979       | 0,026030781    | 0,03656639       |
| 0     | 139   | 850     | 5539      | 28829       | 0,025740741    | 0,030379928      |
| 0     | 79    | 711     | 5618      | 29540       | 0,014262502    | 0,024662666      |
| 0     | 39    | 632     | 5657      | 30172       | 0,006941972    | 0,021394719      |

**Table 17:Regression of Sock’s sales change % and Inventory level change %**

| <i>Regression Statistics</i> |             |
|------------------------------|-------------|
| Multiple R                   | 0,903954375 |
| R Square                     | 0,817133513 |
| Adjusted R Square            | 0,811037963 |
| Standart Error               | 0,136678246 |
| Observations                 | 32          |

| ANOVA     |           |            |           |          |                     |
|-----------|-----------|------------|-----------|----------|---------------------|
|           | <i>df</i> | <i>SS</i>  | <i>MS</i> | <i>F</i> | <i>Significance</i> |
| Regresyon | 1         | 2,50425728 | 2,504257  | 134,0541 | 1,35718E-12         |
| Fark      | 30        | 0,56042828 | 0,018681  |          |                     |
| Toplam    | 31        | 3,06468557 |           |          |                     |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,076103571         | 0,03265132            | -2,3308       | 0,026675       | 0,142786461      | 0,009420682      |
| X1 variable | 1,691932052         | 0,14613116            | 11,57817      | 1,36E-12       | 1,393492403      | 1,990371701      |

According to the results in Table 17, there is a statistically significant relationship between sales and stock ( $p < 0.05$ ). There is a high degree of relationship between variables ( $R = 0.90$ ). The specificity coefficient  $R^2$  was found to be 0.81, and it can be said that 81% of the changes in sales depend on the change in stock amount. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 1,69 branche in sales.

**Table 18: Results of T-Test on Sales of Ank Gordion Store Sock Product**

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 1533,884375      | 175,5625         |
| Variance            | 437816,0317      | 8476,38306       |
| Observation         | 32               | 32               |
| Pearson Correlation | 0,075606456      | -                |
| Hypothesized Mean   | 0                |                  |
| df                  | 31               |                  |
| t Stat              | 11,38496054      |                  |
| P(T<=t) one tail    | 6,6301E-13       |                  |
| t critical one tail | 1,695518783      |                  |
| P(T<=t) two tail    | 1,32602E-12      |                  |
| t critical two tail | 2,039513446      |                  |

The value is 0,000.  $H_0$  hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages.

### 4.3.2 Shoe product

Inventory level and sales numbers are shown by table 19 for Shoe products for Gordion 's stores. Datas are obtained week by week. Inventory level is measured at the begining of the week. Sales numbers are the total sales number during that week.

**Table 19:** Gordion store's Shoe's sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
| 150   | 88    | 100     | 88        | 100         |                |                  |
|       | 73    | 90      | 161       | 190         | 0,829545455    | 0,9              |
| 300   | 137   | 137     | 298       | 327         | 0,850931677    | 0,721052632      |
| 200   | 128   | 244     | 426       | 571         | 0,429530201    | 0,74617737       |
|       | 100   | 191     | 526       | 762         | 0,234741784    | 0,334500876      |
|       | 128   | 503     | 654       | 1.265       | 0,243346008    | 0,660104987      |
| 500   | 184   | 375     | 838       | 1.640       | 0,281345566    | 0,296442688      |
|       | 39    | 391     | 877       | 2.031       | 0,046539379    | 0,238414634      |
|       | 49    | 452     | 926       | 2.483       | 0,055872292    | 0,222550468      |
| 500   | 168   | 403     | 1.094     | 2.886       | 0,181425486    | 0,162303665      |
|       | 114   | 235     | 1.208     | 3.121       | 0,104204753    | 0,081427581      |
|       | 149   | 321     | 1.357     | 3.442       | 0,123344371    | 0,10285165       |
| 500   | 151   | 472     | 1.508     | 3.914       | 0,111274871    | 0,137129576      |
|       | 146   | 321     | 1.654     | 4.235       | 0,096816976    | 0,082013286      |
|       | 218   | 175     | 1.872     | 4.410       | 0,131801693    | 0,041322314      |
|       | 274   | 357     | 2.146     | 4.767       | 0,146367521    | 0,080952381      |
| 600   | 184   | 483     | 2.330     | 5.250       | 0,085740913    | 0,101321586      |
|       | 113   | 299     | 2.443     | 5.549       | 0,048497854    | 0,056952381      |
|       | 84    | 386     | 2.527     | 5.935       | 0,034383954    | 0,069562083      |
|       | 90    | 602     | 2.617     | 6.537       | 0,035615354    | 0,101432182      |
|       | 94    | 512     | 2.711     | 7.049       | 0,035918991    | 0,07832339       |
| 900   | 138   | 418     | 2.849     | 7.467       | 0,050903726    | 0,059299191      |
|       | 143   | 280     | 2.992     | 7.747       | 0,05019305     | 0,037498326      |
|       | 119   | 338     | 3.111     | 8.085       | 0,039772727    | 0,043629792      |
|       | 198   | 219     | 3.309     | 8.304       | 0,06364513     | 0,027087199      |
|       | 171   | 221     | 3.480     | 8.525       | 0,051677244    | 0,02661368       |
|       | 234   | 50      | 3.714     | 8.575       | 0,067241379    | 0,005865103      |
|       | 260   | 116     | 3.974     | 8.691       | 0,070005385    | 0,013527697      |
|       | 244   | 256     | 4.218     | 8.947       | 0,061399094    | 0,029455759      |
| 300   | 103   | 312     | 4.321     | 9.259       | 0,024419156    | 0,034872024      |
| 750   | 138   | 209     | 4.459     | 9.468       | 0,031937052    | 0,022572632      |
|       | 171   | 371     | 4.630     | 9.839       | 0,038349406    | 0,039184622      |
|       | 41    | 200     | 4.671     | 10.039      | 0,008855292    | 0,020327269      |

**Table 20:**Regression of Shoe's sales change % and Inventory level change %

| <i>Regression Statistics</i> |             |  |  |  |  |  |
|------------------------------|-------------|--|--|--|--|--|
| Multiple R                   | 0,88878522  |  |  |  |  |  |
| R Square                     | 0,789939168 |  |  |  |  |  |
| Adjusted R Square            | 0,78293714  |  |  |  |  |  |
| Standart Error               | 0,094596519 |  |  |  |  |  |
| Observations                 | 32          |  |  |  |  |  |

| <i>ANOVA</i> |           |            |           |          |                     |  |
|--------------|-----------|------------|-----------|----------|---------------------|--|
|              | <i>df</i> | <i>SS</i>  | <i>MS</i> | <i>F</i> | <i>Significance</i> |  |
| Regression   | 1         | 1,00953211 | 1,009532  | 112,8158 | 1,10306E-11         |  |
| Residual     | 30        | 0,26845504 | 0,008949  |          |                     |  |
| Total        | 31        | 1,27798715 |           |          |                     |  |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,014696518         | 0,0207846             | 0,707087      | 0,484969       | 0,027751294      | 0,05714433       |
| X1 variable | 0,752561254         | 0,07085279            | 10,62148      | 1,1E-11        | 0,607860557      | 0,897261951      |

According to the results in Table 20, there is a statistically significant relationship between sales and stock ( $p < 0.05$ ). There is a high degree of relationship between variables ( $R = 0.88$ ). The specificity coefficient  $R^2$  is found to be 0.78, and it can be said that 78% of the changes in sales depend on the change in stock amount.

According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branche changes in the stock will cause a change of 0,75 branche in sales.

**Table 21:** Results of T-Test on Sales of Gordion Store Shoe Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 148,6227273      | 141,545455       |
| Variance            | 4015,517983      | 3642,19318       |
| Observation         | 33               | 33               |
| Pearson Correlation | 1                |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 13,47322023      |                  |
| P(T<=t) one tail    | 4,88772E-15      |                  |
| t critical one tail | 1,693888748      |                  |
| P(T<=t) two tail    | 9,77545E-15      |                  |
| t critical two tail | 2,036933343      |                  |

The value is 0,000.  $H_0$  hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages



### 4.3.3 T-shirt product

Inventory level and sales numbers are shown by table 22 for T-shirt products for Gordion 's stores. Datas are obtained week by week. Inventory level is measured at the beginning of the week. Sales numbers are the total sales number during that week.

**Table 22:** Gordion store's T-shirt's sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
| 150   | 116   | 100     | 116       | 100         |                |                  |
|       | 139   | 284     | 255       | 384         | 1,198275862    | 2,84             |
| 300   | 138   | 345     | 393       | 729         | 0,541176471    | 0,8984375        |
| 200   | 139   | 407     | 532       | 1.136       | 0,353689567    | 0,55829904       |
|       | 104   | 568     | 636       | 1.704       | 0,195488722    | 0,5              |
|       | 211   | 464     | 847       | 2.168       | 0,331761006    | 0,272300469      |
| 500   | 199   | 253     | 1.046     | 2.421       | 0,234946871    | 0,116697417      |
|       | 224   | 554     | 1.270     | 2.975       | 0,21414914     | 0,228831062      |
|       | 166   | 830     | 1.436     | 3.805       | 0,130708661    | 0,278991597      |
| 500   | 218   | 664     | 1.654     | 4.469       | 0,151810585    | 0,174507227      |
|       | 194   | 938     | 1.848     | 5.407       | 0,117291415    | 0,209890356      |
|       | 220   | 744     | 2.068     | 6.151       | 0,119047619    | 0,137599408      |
| 500   | 123   | 524     | 2.191     | 6.675       | 0,059477756    | 0,0851894        |
|       | 108   | 1201    | 2.299     | 7.876       | 0,04929256     | 0,179925094      |
|       | 200   | 1093    | 2.499     | 8.969       | 0,086994345    | 0,138776028      |
|       | 198   | 893     | 2.697     | 9.862       | 0,079231693    | 0,099565169      |
| 600   | 131   | 695     | 2.828     | 10.557      | 0,048572488    | 0,070472521      |
|       | 112   | 564     | 2.940     | 11.121      | 0,03960396     | 0,053424268      |
|       | 150   | 452     | 3.090     | 11.573      | 0,051020408    | 0,040643827      |
|       | 100   | 302     | 3.190     | 11.875      | 0,03236246     | 0,026095222      |
|       | 107   | 202     | 3.297     | 12.077      | 0,03354232     | 0,017010526      |
| 900   | 115   | 695     | 3.412     | 12.772      | 0,034880194    | 0,057547404      |
|       | 49    | 580     | 3.461     | 13.352      | 0,014361079    | 0,045411838      |
|       | 32    | 531     | 3.493     | 13.883      | 0,009245883    | 0,039769323      |
|       | 64    | 499     | 3.557     | 14.382      | 0,018322359    | 0,03594324       |
|       | 62    | 435     | 3.619     | 14.817      | 0,017430419    | 0,030246141      |
|       | 74    | 373     | 3.693     | 15.190      | 0,020447637    | 0,025173787      |
|       | 79    | 299     | 3.772     | 15.489      | 0,021391822    | 0,019684003      |
|       | 119   | 220     | 3.891     | 15.709      | 0,03154825     | 0,014203628      |
| 300   | 91    | 101     | 3.982     | 15.810      | 0,023387304    | 0,006429435      |
| 750   | 118   | 210     | 4.100     | 16.020      | 0,02963335     | 0,013282732      |
|       | 108   | 592     | 4.208     | 16.612      | 0,026341463    | 0,036953808      |
|       | 88    | 484     | 4.296     | 17.096      | 0,020912548    | 0,029135565      |

**Table 23:**Regression of T-shirt's sales change % and Inventory level change %

| <i>Regression Statistics</i> |             |  |  |  |  |  |
|------------------------------|-------------|--|--|--|--|--|
| Multiple R                   | 0,925772387 |  |  |  |  |  |
| R Square                     | 0,857054512 |  |  |  |  |  |
| Adjusted R Square            | 0,852289663 |  |  |  |  |  |
| Standart Error               | 0,09549666  |  |  |  |  |  |
| Observations                 | 32          |  |  |  |  |  |

| <i>ANOVA</i> |           |            |           |          |                     |  |
|--------------|-----------|------------|-----------|----------|---------------------|--|
|              | <i>df</i> | <i>SS</i>  | <i>MS</i> | <i>F</i> | <i>Significance</i> |  |
| Regression   | 1         | 1,64034656 | 1,640347  | 179,8702 | 3,30048E-14         |  |
| Residual     | 30        | 0,27358836 | 0,00912   |          |                     |  |
| Total        | 31        | 1,91393492 |           |          |                     |  |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,055451617         | 0,01851176            | 2,995481      | 0,005452       | 0,017645565      | 0,093257669      |
| X1 variable | 0,447764658         | 0,03338645            | 13,41157      | 3,3E-14        | 0,37958044       | 0,515948877      |

According to the results in Table 23, there is a statistically relationship between sales and inventory level ( $p < 0.05$ ). There is a relationship between variables ( $R = 0.92$ ). The specificity coefficient  $R^2$  is found to be 0.85, and it can be said that 85% of the changes in sales depend on the inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the inventory level will cause a change of 0,44 branche in sales

**Table 24:** Results of T-Test on Sales of Gordion T-shirt Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 143,2            | 130,1818182      |
| Variance            | 3397,185         | 2807,590909      |
| Observation         | 33               | 33               |
| Pearson Correlation | 1                |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 14,11368398      |                  |
| P(T<=t) one tail    | 1,36137E-15      |                  |
| t critical one tail | 1,693888748      |                  |
| P(T<=t) two tail    | 2,72273E-15      |                  |
| t critical two tail | 2,036933343      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.3.4 Hoodie**

Inventory level and sales numbers are shown by table 25 for Hoodie products for Gordion 's stores. Datas are obtained week by week. Inventory level is measured at the beginning of the week. Sales numbers are the total sales number during that week.

**Table 25:** Gordion store's Hoodie sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 48    | 182     | 48        | 182         |                |                  |
|       | 43    | 134     | 91        | 316         | 0,895833333    | 0,736263736      |
|       | 52    | 91      | 143       | 407         | 0,571428571    | 0,287974684      |
| 300   | 57    | 39      | 200       | 446         | 0,398601399    | 0,095823096      |
|       | 84    | 282     | 284       | 728         | 0,42           | 0,632286996      |
|       | 107   | 198     | 391       | 926         | 0,376760563    | 0,271978022      |
| 500   | 78    | 91      | 469       | 1.017       | 0,199488491    | 0,098272138      |
|       | 89    | 513     | 558       | 1.530       | 0,189765458    | 0,504424779      |
|       | 100   | 424     | 658       | 1.954       | 0,17921147     | 0,277124183      |
|       | 107   | 324     | 765       | 2.278       | 0,162613982    | 0,165813715      |
| 500   | 67    | 217     | 832       | 2.495       | 0,087581699    | 0,095258999      |
|       | 112   | 650     | 944       | 3.145       | 0,134615385    | 0,260521042      |
|       | 65    | 538     | 1.009     | 3.683       | 0,068855932    | 0,171065183      |
|       | 84    | 473     | 1.093     | 4.156       | 0,083250743    | 0,128427912      |
|       | 135   | 389     | 1.228     | 4.545       | 0,123513266    | 0,093599615      |
| 400   | 128   | 254     | 1.356     | 4.799       | 0,104234528    | 0,055885589      |
|       | 87    | 526     | 1.443     | 5.325       | 0,064159292    | 0,109606168      |
|       | 106   | 439     | 1.549     | 5.764       | 0,073458073    | 0,082441315      |
| 200   | 119   | 333     | 1.668     | 6.097       | 0,076823757    | 0,05777238       |
|       | 116   | 414     | 1.784     | 6.511       | 0,069544365    | 0,067902247      |
| 600   | 92    | 298     | 1.876     | 6.809       | 0,051569507    | 0,045768699      |
|       | 98    | 806     | 1.974     | 7.615       | 0,052238806    | 0,118372742      |
|       | 79    | 708     | 2.053     | 8.323       | 0,040020263    | 0,092974393      |
|       | 52    | 629     | 2.105     | 8.952       | 0,025328787    | 0,075573711      |
|       | 122   | 577     | 2.227     | 9.529       | 0,057957245    | 0,06445487       |
|       | 92    | 455     | 2.319     | 9.984       | 0,041311181    | 0,047748977      |
|       | 83    | 363     | 2.402     | 10.347      | 0,035791289    | 0,036358173      |
|       | 98    | 280     | 2.500     | 10.627      | 0,040799334    | 0,027060984      |
| 500   | 94    | 182     | 2.594     | 10.809      | 0,0376         | 0,017126188      |
|       | 78    | 588     | 2.672     | 11.397      | 0,030069391    | 0,054399112      |
|       | 76    | 510     | 2.748     | 11.907      | 0,028443114    | 0,044748618      |
|       | 114   | 434     | 2.862     | 12.341      | 0,041484716    | 0,036449148      |
|       | 70    | 320     | 2.932     | 12.661      | 0,024458421    | 0,025929827      |

**Table 26:**Regression of Hoodi's sales change % and Inventory level change %

| <i>Regression Statistics</i> |             |
|------------------------------|-------------|
| Multiple R                   | 0,801590364 |
| R Square                     | 0,642547111 |
| Adjusted R Square            | 0,630632015 |
| Standart Error               | 0,116010125 |
| Observations                 | 32          |

| ANOVA     |           |            |           |          |                     |
|-----------|-----------|------------|-----------|----------|---------------------|
|           | <i>df</i> | <i>SS</i>  | <i>MS</i> | <i>F</i> | <i>Significance</i> |
| Regresyon | 1         | 0,72577033 | 0,72577   | 53,92714 | 3,52229E-08         |
| Fark      | 30        | 0,40375047 | 0,013458  |          |                     |
| Toplam    | 31        | 1,1295208  |           |          |                     |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,015595478         | 0,02745002            | 0,568141      | 0,574168       | 0,040464935      | 0,071655892      |
| X1 variable | 0,878745479         | 0,11966286            | 7,34351       | 3,52E-08       | 0,634361307      | 1,123129651      |

According to the results in Table 26, there is a statistically significant relationship between sales and stock ( $p < 0.05$ ). There is a high degree of relationship between variables ( $R = 0.80$ ). The specificity coefficient  $R^2$  was found to be 0.64, and it can be said that 64% of the changes in sales depend on the change in stock amount. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 0,87 branche in sales

**Table 27:** Results of T-Test on Sales of Gordion T-shirt Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 97,73333         | 88,8485          |
| Variance            | 693,9442         | 573,508          |
| Observation         | 33               | 33               |
| Pearson Correlation | 1                |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 21,31265         |                  |
| P(T<=t) one tail    | 8,95E-21         |                  |
| t critical one tail | 1,693889         |                  |
| P(T<=t) two tail    | 1,79E-20         |                  |
| t critical two tail | 2,036933         |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.3.5.Short product**

Inventory level and sales numbers are shown by table 28 for Hoodie products for Gordion 's stores. Datas are obtained week by week. Inventory level is measured at the begining of the week. Sales numbers are the total sales number during that week

**Table 28:** Gordion store's Short sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 90    | 100     | 90        | 100         |                |                  |
| 200   | 106   | 210     | 196       | 310         | 1,177777778    | 2,1              |
|       | 78    | 104     | 274       | 414         | 0,397959184    | 0,335483871      |
| 300   | 135   | 326     | 409       | 740         | 0,49270073     | 0,787439614      |
| 250   | 146   | 441     | 555       | 1.181       | 0,356968215    | 0,595945946      |
|       | 170   | 295     | 725       | 1.476       | 0,306306306    | 0,249788315      |
| 350   | 167   | 475     | 892       | 1.951       | 0,230344828    | 0,321815718      |
| 500   | 125   | 808     | 1.017     | 2.759       | 0,140134529    | 0,414146591      |
|       | 113   | 683     | 1.130     | 3.442       | 0,111111111    | 0,247553461      |
|       | 112   | 570     | 1.242     | 4.012       | 0,099115044    | 0,165601395      |
|       | 163   | 458     | 1.405     | 4.470       | 0,131239936    | 0,114157527      |
|       | 120   | 295     | 1.525     | 4.765       | 0,085409253    | 0,065995526      |
| 800   | 109   | 975     | 1.634     | 5.740       | 0,07147541     | 0,204616999      |
|       | 91    | 866     | 1.725     | 6.606       | 0,055691554    | 0,15087108       |
|       | 131   | 775     | 1.856     | 7.381       | 0,075942029    | 0,11731759       |
|       | 140   | 644     | 1.996     | 8.025       | 0,075431034    | 0,08725105       |
|       | 171   | 504     | 2.167     | 8.529       | 0,085671343    | 0,062803738      |
|       | 108   | 333     | 2.275     | 8.862       | 0,049838486    | 0,039043264      |
|       | 105   | 225     | 2.380     | 9.087       | 0,046153846    | 0,025389303      |
| 250   | 109   | 370     | 2.489     | 9.457       | 0,045798319    | 0,040717509      |
| 300   | 104   | 561     | 2.593     | 10.018      | 0,041783849    | 0,059321138      |
|       | 129   | 457     | 2.722     | 10.475      | 0,049749325    | 0,045617888      |
|       | 123   | 328     | 2.845     | 10.803      | 0,045187362    | 0,031312649      |
|       | 97    | 205     | 2.942     | 11.008      | 0,034094903    | 0,01897621       |
|       | 86    | 108     | 3.028     | 11.116      | 0,029231815    | 0,009811047      |
| 900   | 44    | 922     | 3.072     | 12.038      | 0,014531044    | 0,082943505      |
|       | 72    | 878     | 3.144     | 12.916      | 0,0234375      | 0,072935704      |
|       | 74    | 806     | 3.218     | 13.722      | 0,023536896    | 0,062403221      |
|       | 58    | 732     | 3.276     | 14.454      | 0,018023617    | 0,053344993      |
|       | 56    | 674     | 3.332     | 15.128      | 0,017094017    | 0,04663069       |
|       | 93    | 618     | 3.425     | 15.746      | 0,027911164    | 0,040851401      |

**Table 29:**Regression of Short sales change % and Inventory level change %

| <i>Regression Statistics</i> |           |
|------------------------------|-----------|
| Multiple R                   | 0,969848  |
| R Square                     | 0,9406051 |
| Adjusted R Square            | 0,9386253 |
| Standart Error               | 0,055694  |
| Observations                 | 32        |

| <i>ANOVA</i> |           |             |           |           |                     |
|--------------|-----------|-------------|-----------|-----------|---------------------|
|              | <i>df</i> | <i>SS</i>   | <i>MS</i> | <i>F</i>  | <i>Significance</i> |
| Regression   | 1         | 1,473657164 | 1,473657  | 475,09395 | 6,004E-20           |
| Residual     | 30        | 0,093054679 | 0,003102  |           |                     |
| Total        | 31        | 1,566711843 |           |           |                     |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,0199764           | 0,011233494           | 1,778293      | 0,0854934      | -0,0029654       | 0,0429183        |
| X1 variable | 0,5623454           | 0,025799626           | 21,79665      | 6,004E-20      | 0,50965555       | 0,61503529       |

According to the results in Table 29, there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a high degree of relationship between variables ( $R = 0.96$ ). The specificity coefficient  $R^2$  is found to be 0.94, and it can be said that 94% of the changes in sales depend on the change in inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 0,56 branche in sales



**Table 30:** Results of T-Test on Sales of Gordion Short Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 120,2333         | 109,303          |
| Variance            | 1296,325         | 1071,343         |
| Observation         | 33               | 33               |
| Pearson Correlation | 1                |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 19,18337         |                  |
| P(T<=t) one tail    | 2,05E-19         |                  |
| t critical one tail | 1,693889         |                  |
| P(T<=t) two tail    | 4,1E-19          |                  |
| t critical two tail | 2,036933         |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.4. IST Akbati Stores**

In Akbati 's stores 5 products are examined. First relationship between sales and inventory level are observed. Then inventory level is increased to see if number of unit sold give reaction to change of inventory level.

##### **4.4.1. Sock Product.**

Inventory level and sales numbers are shown by table 31 for socks products for Akbati 's stores. Datas are obtained week by week. Inventory level is measured at the begining of the week. Sales numbers are the total sales number during that week.

**Table 31:** Akbati store's sock's sales and Inventory level.

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
| 1.000 | 62    | 100     | 62        | 100         |                |                  |
|       | 115   | 1.038   | 177       | 1.138       | 1,85483871     | 10,38            |
|       | 79    | 923     | 256       | 2.061       | 0,446327684    | 0,811072056      |
|       | 82    | 844     | 338       | 2.905       | 0,3203125      | 0,409509947      |
|       | 146   | 762     | 484       | 3.667       | 0,431952663    | 0,262306368      |
|       | 97    | 616     | 581       | 4.283       | 0,200413223    | 0,167984729      |
|       | 99    | 519     | 680       | 4.802       | 0,170395869    | 0,121176745      |
|       | 125   | 420     | 805       | 5.222       | 0,183823529    | 0,087463557      |
|       | 36    | 295     | 841       | 5.517       | 0,044720497    | 0,056491766      |
|       | 94    | 259     | 935       | 5.776       | 0,1117717      | 0,046945804      |
|       | 45    | 165     | 980       | 5.941       | 0,048128342    | 0,028566482      |
|       | 19    | 120     | 999       | 6.061       | 0,019387755    | 0,02019862       |
| 1.000 | 74    | 101     | 1.073     | 6.162       | 0,074074074    | 0,016663917      |
|       | 99    | 1.027   | 1.172     | 7.189       | 0,092264678    | 0,166666667      |
|       | 117   | 928     | 1.289     | 8.117       | 0,099829352    | 0,129086104      |
|       | 78    | 811     | 1.367     | 8.928       | 0,060512025    | 0,099913761      |
|       | 85    | 733     | 1.452     | 9.661       | 0,062179956    | 0,082101254      |
|       | 62    | 648     | 1.514     | 10.309      | 0,042699725    | 0,067073802      |
|       | 10    | 586     | 1.524     | 10.895      | 0,00660502     | 0,056843535      |
| 2.100 | 55    | 576     | 1.579     | 11.471      | 0,036089239    | 0,052868288      |
|       | 83    | 2.621   | 1.662     | 14.092      | 0,052564915    | 0,228489234      |
|       | 58    | 2.538   | 1.720     | 16.630      | 0,034897714    | 0,180102186      |
|       | 101   | 2.480   | 1.821     | 19.110      | 0,05872093     | 0,149128082      |
|       | 86    | 2.379   | 1.907     | 21.489      | 0,047226798    | 0,124489796      |
|       | 58    | 2.293   | 1.965     | 23.782      | 0,030414263    | 0,106705756      |
|       | 115   | 2.235   | 2.080     | 26.017      | 0,058524173    | 0,093978639      |
|       | 98    | 2.120   | 2.178     | 28.137      | 0,047115385    | 0,081485183      |
|       | 37    | 2.022   | 2.215     | 30.159      | 0,016988062    | 0,071862672      |
|       | 77    | 1.985   | 2.292     | 32.144      | 0,03476298     | 0,065817832      |
|       | 112   | 1.908   | 2.404     | 34.052      | 0,04886562     | 0,059357889      |
|       | 221   | 1.796   | 2.625     | 35.848      | 0,091930116    | 0,052742864      |
| 4.100 | 289   | 1.575   | 2.914     | 37.423      | 0,110095238    | 0,043935505      |
|       | 115   | 5.386   | 3.029     | 42.809      | 0,039464653    | 0,143922187      |

**Table 32:**Regression of Sock sales change % and Inventory level change %

| <i>Regression Statistics</i> |             |  |  |  |  |  |
|------------------------------|-------------|--|--|--|--|--|
| Multiple R                   | 0,96089129  |  |  |  |  |  |
| R Square                     | 0,923312071 |  |  |  |  |  |
| Adjusted R Square            | 0,920755807 |  |  |  |  |  |
| Standart Error               | 0,092560415 |  |  |  |  |  |
| Observations                 | 32          |  |  |  |  |  |

| ANOVA      |           |             |           |          |                     |  |
|------------|-----------|-------------|-----------|----------|---------------------|--|
|            | <i>df</i> | <i>SS</i>   | <i>MS</i> | <i>F</i> | <i>Significance</i> |  |
| Regression | 1         | 3,094520383 | 3,0945    | 361,1959 | 2,798E-18           |  |
| Residual   | 30        | 0,257022914 | 0,0086    |          |                     |  |
| Total      | 31        | 3,351543297 |           |          |                     |  |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,076985505         | 0,016876759           | 4,5616        | 8,01E-05       | 0,0425186        | 0,11145244       |
| X1 variable | 0,173824384         | 0,009146171           | 19,005        | 2,8E-18        | 0,1551454        | 0,19250336       |

According to the results in Table 32, there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a high degree of relationship between variables ( $R = 0.96$ ). The specificity coefficient  $R^2$  is found to be 0.92, and it can be said that 92% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 0,17 branche in sales

**Table 33:** Results of T-Test on Sales of Akbati Sock Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 98,19697         | 91,78788         |
| Variance            | 2663,2516        | 2793,547         |
| Observation         | 33               | 33               |
| Pearson             |                  |                  |
| Correlation         | 0,1423044        |                  |
| Hypothesized        |                  |                  |
| Mean                | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 0,5381552        |                  |
| P(T<=t) one tail    | 0,2970968        |                  |
| t critical one tail | 1,6938887        |                  |
| P(T<=t) two tail    | 0,5941936        |                  |
| t critical two tail | 2,0369333        |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.4.2 Shoes Product**

Inventory level and sales numbers are shown by table 34 for socks products for Akbati 's stores. Datas are obtained week by week. Inventory level is measured at the begining of the week. Sales numbers are the total sales number during that week.

**Table 34:** Akbati store's shoe's sales and Inventory level.

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 50    | 211     | 50        | 211         |                |                  |
|       | 38    | 161     | 88        | 372         | 0,76           | 0,763033175      |
| 10    | 49    | 123     | 137       | 495         | 0,556818182    | 0,330645161      |
|       | 70    | 84      | 207       | 579         | 0,510948905    | 0,16969697       |
| 120   | 36    | 14      | 243       | 593         | 0,173913043    | 0,02417962       |
| 180   | 25    | 98      | 268       | 691         | 0,102880658    | 0,165261383      |
|       | 40    | 253     | 308       | 944         | 0,149253731    | 0,366136035      |
|       | 72    | 213     | 380       | 1.157       | 0,233766234    | 0,225635593      |
| 35    | 96    | 141     | 476       | 1.298       | 0,252631579    | 0,121866897      |
|       | 64    | 80      | 540       | 1.378       | 0,134453782    | 0,061633282      |
| 177   | 64    | 16      | 604       | 1.394       | 0,118518519    | 0,01161103       |
| 80    | 67    | 129     | 671       | 1.523       | 0,110927152    | 0,092539455      |
| 45    | 83    | 142     | 754       | 1.665       | 0,123695976    | 0,093237032      |
| 60    | 80    | 104     | 834       | 1.769       | 0,106100796    | 0,062462462      |
| 220   | 83    | 84      | 917       | 1.853       | 0,099520384    | 0,047484454      |
|       | 146   | 221     | 1.063     | 2.074       | 0,159214831    | 0,119266055      |
| 255   | 66    | 75      | 1.129     | 2.149       | 0,062088429    | 0,036162006      |
|       | 105   | 264     | 1.234     | 2.413       | 0,093002657    | 0,122847836      |
| 170   | 119   | 159     | 1.353     | 2.572       | 0,09643436     | 0,065893079      |
|       | 177   | 210     | 1.530     | 2.782       | 0,130820399    | 0,081648523      |
| 250   | 92    | 33      | 1.622     | 2.815       | 0,060130719    | 0,01186197       |
| 350   | 171   | 191     | 1.793     | 3.006       | 0,105425401    | 0,067850799      |
|       | 78    | 370     | 1.871     | 3.376       | 0,04350251     | 0,123087159      |
|       | 43    | 292     | 1.914     | 3.668       | 0,022982362    | 0,086492891      |
|       | 54    | 249     | 1.968     | 3.917       | 0,028213166    | 0,067884406      |
| 350   | 73    | 195     | 2.041     | 4.112       | 0,037093496    | 0,049782997      |
|       | 109   | 472     | 2.150     | 4.584       | 0,053405194    | 0,114785992      |
|       | 135   | 363     | 2.285     | 4.947       | 0,062790698    | 0,079188482      |
| 250   | 94    | 228     | 2.379     | 5.175       | 0,041137856    | 0,046088539      |
|       | 53    | 384     | 2.432     | 5.559       | 0,022278268    | 0,074202899      |
| 10    | 52    | 331     | 2.484     | 5.890       | 0,021381579    | 0,059543083      |
|       | 40    | 289     | 2.524     | 6.179       | 0,01610306     | 0,049066214      |
| 100   | 47    | 249     | 2.571     | 6.428       | 0,018621236    | 0,040297783      |

**Table 35:**Regression of Shoe sales change % and Inventory level change

| <i>Regression Statistics</i> |             |
|------------------------------|-------------|
| Multiple R                   | 0,811282616 |
| R Square                     | 0,658179483 |
| Adjusted R Square            | 0,646785466 |
| Standart Error               | 0,09954814  |
| Observations                 | 32          |

| <i>ANOVA</i> |           |           |           |           |                     |
|--------------|-----------|-----------|-----------|-----------|---------------------|
|              | <i>df</i> | <i>SS</i> | <i>MS</i> | <i>F</i>  | <i>Significance</i> |
| Regression   | 1         | 0,572445  | 0,572445  | 57,765358 | 1,7814E-08          |
| Residual     | 30        | 0,297295  | 0,00991   |           |                     |
| Total        | 31        | 0,86974   |           |           |                     |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,026511999         | 0,0231539             | 1,145034      | 0,2612483      | -0,0207746       | 0,07379858       |
| X1 variable | 0,955185241         | 0,1256764             | 7,600352      | 1,781E-08      | 0,69851971       | 1,21185077       |

According to the results in Table 35, there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a high degree of relationship between variables ( $R = 0.81$ ). The specificity coefficient  $R^2$  is found to be 0.65, and it can be said that 65% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 0,95 branche in sales

**Table 36:** Results of T-Test on Sales of Akbati Shoe Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 101,2818182      | 77,909091        |
| Variance            | 2432,265284      | 1439,2102        |
| Observation         | 33               | 33               |
| Pearson Correlation | 1                |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 11,79730991      |                  |
| P(T<=t) one tail    | 1,71507E-13      |                  |
| t critical one tail | 1,693888748      |                  |
| P(T<=t) two tail    | 3,43014E-13      |                  |
| t critical two tail | 2,036933343      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.4.3 T-shirt Product**

Inventory level and sales numbers are shown by table 37 for T-shirt products for Akbati 's stores. Datas are obtained week by week. Inventory level is measured at the begining of the week. Sales numbers are the total sales number during that week.

**Table 37:** Akbati store's T-shirt sales and Inventory level.

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 82    | 114     | 82        | 114         |                |                  |
| 240   | 107   | 32      | 189       | 146         | 1,304878049    | 0,280701754      |
| 240   | 112   | 165     | 301       | 311         | 0,592592593    | 1,130136986      |
|       | 100   | 293     | 401       | 604         | 0,332225914    | 0,942122186      |
|       | 116   | 193     | 517       | 797         | 0,289276808    | 0,319536424      |
| 480   | 142   | 77      | 659       | 874         | 0,274661509    | 0,096612296      |
|       | 151   | 415     | 810       | 1.289       | 0,229135053    | 0,474828375      |
|       | 232   | 264     | 1.042     | 1.553       | 0,286419753    | 0,20480993       |
| 960   | 126   | 32      | 1.168     | 1.585       | 0,120921305    | 0,02060528       |
|       | 162   | 866     | 1.330     | 2.451       | 0,13869863     | 0,54637224       |
|       | 148   | 704     | 1.478     | 3.155       | 0,111278195    | 0,287229702      |
|       | 139   | 556     | 1.617     | 3.711       | 0,094046008    | 0,176228209      |
|       | 101   | 417     | 1.718     | 4.128       | 0,062461348    | 0,112368634      |
| 480   | 139   | 316     | 1.857     | 4.444       | 0,080908033    | 0,076550388      |
|       | 206   | 657     | 2.063     | 5.101       | 0,11093161     | 0,147839784      |
|       | 115   | 451     | 2.178     | 5.552       | 0,055744062    | 0,088414036      |
|       | 161   | 336     | 2.339     | 5.888       | 0,073921028    | 0,060518732      |
|       | 132   | 175     | 2.471     | 6.063       | 0,056434374    | 0,029721467      |
| 480   | 134   | 43      | 2.605     | 6.106       | 0,054229057    | 0,007092199      |
| 320   | 135   | 389     | 2.740     | 6.495       | 0,051823417    | 0,063707828      |
|       | 103   | 574     | 2.843     | 7.069       | 0,037591241    | 0,088375674      |
|       | 108   | 471     | 2.951     | 7.540       | 0,037988041    | 0,066628943      |
|       | 68    | 363     | 3.019     | 7.903       | 0,023043036    | 0,048143236      |
|       | 55    | 295     | 3.074     | 8.198       | 0,018217953    | 0,037327597      |
|       | 98    | 240     | 3.172     | 8.438       | 0,031880286    | 0,029275433      |
|       | 67    | 142     | 3.239     | 8.580       | 0,02112232     | 0,016828632      |
| 240   | 62    | 75      | 3.301     | 8.655       | 0,01914171     | 0,008741259      |
|       | 91    | 253     | 3.392     | 8.908       | 0,027567404    | 0,029231658      |
| 188   | 58    | 162     | 3.450     | 9.070       | 0,017099057    | 0,0181859        |
|       | 80    | 292     | 3.530     | 9.362       | 0,023188406    | 0,032194046      |
|       | 67    | 212     | 3.597     | 9.574       | 0,01898017     | 0,022644734      |
|       | 85    | 145     | 3.682     | 9.719       | 0,023630803    | 0,015145185      |
|       | 45    | 60      | 3.727     | 9.779       | 0,012221619    | 0,006173475      |



**Table 38:**Regression of Sock sales change % and Inventory level change

| <i>Regression Statistics</i> |  |             |  |  |  |  |
|------------------------------|--|-------------|--|--|--|--|
| Multiple R                   |  | 0,505563207 |  |  |  |  |
| R Square                     |  | 0,255594157 |  |  |  |  |
| Adjusted R Square            |  | 0,230780629 |  |  |  |  |
| Standart Error               |  | 0,216603041 |  |  |  |  |
| Observations                 |  | 32          |  |  |  |  |

| <i>ANOVA</i> |           |             |           |          |                     |  |
|--------------|-----------|-------------|-----------|----------|---------------------|--|
|              | <i>df</i> | <i>SS</i>   | <i>MS</i> | <i>F</i> | <i>Significance</i> |  |
| Regression   | 1         | 0,483271854 | 0,4832719 | 10,3006  | 0,0031606           |  |
| Residual     | 30        | 1,407506324 | 0,0469169 |          |                     |  |
| Total        | 31        | 1,890778178 |           |          |                     |  |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,063916613         | 0,045832467           | 1,3945706     | 0,17339        | -0,029686        | 0,157519         |
| X1 variable | 0,471697544         | 0,146971259           | 3,2094543     | 0,00316        | 0,1715422        | 0,7718529        |

According to the results in Table 38, there is a statistically significant relationship between sales and change of inventory level ( $p < 0.05$ ). There is a relationship between variables ( $R = 0.50$ ). The specificity coefficient  $R^2$  is found to be 0.25, and it can be said that 25% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 0,47 branche in sales

**Table 39:** Results of T-Test on Sales of Akbati T-shirt Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 146,8212121      | 112,93939        |
| Variance            | 3049,070473      | 1804,1837        |
| Observation         | 33               | 33               |
| Pearson Correlation | 1                |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 15,27432559      |                  |
| P(T<=t) one tail    | 1,49138E-16      |                  |
| t critical one tail | 1,693888748      |                  |
| P(T<=t) two tail    | 2,98277E-16      |                  |
| t critical two tail | 2,036933343      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.4.4 Hoodie Product**

Inventory level and sales numbers are shown by table 40 for Hoodie products for Akbati 's stores. Datas are obtained week by week. Inventory level is measured at the begining of the week. Sales numbers are the total sales number during that week.

**Table 40** Akbati store's Hoodie sales and Inventory level.

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 51    | 188     | 51        | 188         |                |                  |
| 30    | 76    | 137     | 127       | 325         | 1,490196078    | 0,728723404      |
| 300   | 36    | 91      | 163       | 416         | 0,283464567    | 0,28             |
|       | 60    | 355     | 223       | 771         | 0,36809816     | 0,853365385      |
|       | 55    | 295     | 278       | 1.066       | 0,246636771    | 0,382619974      |
|       | 83    | 240     | 361       | 1.306       | 0,298561151    | 0,225140713      |
| 540   | 108   | 157     | 469       | 1.463       | 0,299168975    | 0,120214395      |
|       | 115   | 589     | 584       | 2.052       | 0,245202559    | 0,402597403      |
|       | 103   | 474     | 687       | 2.526       | 0,176369863    | 0,230994152      |
|       | 128   | 371     | 815       | 2.897       | 0,186317322    | 0,146872526      |
| 600   | 160   | 243     | 975       | 3.140       | 0,196319018    | 0,083879876      |
| 300   | 151   | 683     | 1.126     | 3.823       | 0,154871795    | 0,217515924      |
|       | 115   | 832     | 1.241     | 4.655       | 0,102131439    | 0,217630133      |
| 300   | 111   | 717     | 1.352     | 5.372       | 0,089443997    | 0,154027927      |
|       | 142   | 906     | 1.494     | 6.278       | 0,105029586    | 0,168652271      |
|       | 151   | 764     | 1.645     | 7.042       | 0,10107095     | 0,121694807      |
|       | 173   | 613     | 1.818     | 7.655       | 0,105167173    | 0,087049134      |
|       | 131   | 440     | 1.949     | 8.095       | 0,072057206    | 0,057478772      |
| 480   | 124   | 309     | 2.073     | 8.404       | 0,06362237     | 0,038171711      |
|       | 136   | 665     | 2.209     | 9.069       | 0,065605403    | 0,079128986      |
|       | 92    | 529     | 2.301     | 9.598       | 0,041647804    | 0,058330577      |
| 600   | 108   | 437     | 2.409     | 10.035      | 0,046936115    | 0,045530319      |
|       | 70    | 929     | 2.479     | 10.964      | 0,0290577      | 0,092575984      |
|       | 67    | 859     | 2.546     | 11.823      | 0,027027027    | 0,078347318      |
|       | 128   | 792     | 2.674     | 12.615      | 0,050274941    | 0,066988074      |
|       | 94    | 664     | 2.768     | 13.279      | 0,035153328    | 0,052635751      |
|       | 105   | 570     | 2.873     | 13.849      | 0,037933526    | 0,042924919      |
|       | 119   | 465     | 2.992     | 14.314      | 0,041420118    | 0,033576432      |
|       | 106   | 346     | 3.098     | 14.660      | 0,035427807    | 0,024172139      |
|       | 110   | 240     | 3.208     | 14.900      | 0,035506779    | 0,016371078      |
|       | 56    | 130     | 3.264     | 15.030      | 0,017456359    | 0,008724832      |
|       | 20    | 74      | 3.284     | 15.104      | 0,006127451    | 0,004923486      |
|       | 18    | 54      | 3.302     | 15.158      | 0,005481121    | 0,003575212      |

**Table 41:**Regression of Hoodie sales change % and Inventory level change

| <i>Regression Statistics</i> |             |
|------------------------------|-------------|
| Multiple R                   | 0,74677257  |
| R Square                     | 0,557669271 |
| Adjusted R Square            | 0,542924913 |
| Standart Error               | 0,177811737 |
| Observations                 | 32          |

| <i>ANOVA</i> |           |             |           |          |                     |
|--------------|-----------|-------------|-----------|----------|---------------------|
|              | <i>df</i> | <i>SS</i>   | <i>MS</i> | <i>F</i> | <i>Significance</i> |
| Regression   | 1         | 1,195836236 | 1,1958362 | 37,8226  | 9,174E-07           |
| Residual     | 30        | 0,948510419 | 0,031617  |          |                     |
| Total        | 31        | 2,144346655 |           |          |                     |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|
| Intercept   | -0,002831622        | 0,040898301           | -0,069236     | 0,94526        | -0,086357        |
| X1 variable | 1,004871317         | 0,163393592           | 6,1500044     | 9,2E-07        | 0,6711771        |

According to the results in Table 41, there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a relationship between variables ( $R = 0.74$ ). The specificity coefficient  $R^2$  is found to be 0.55, and it can be said that 55% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 1,004 branche in sales

**Table 42:** Results of T-Test on Sales of Akbati Hoodie Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 193,15758        | 100,061          |
| Variance            | 4745,4719        | 1551,93          |
| Observation         | 33               | 33               |
| Pearson Correlation | 0,4214779        |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 8,4456123        |                  |
| P(T<=t) one tail    | 5,953E-10        |                  |
| t critical one tail | 1,6938887        |                  |
| P(T<=t) two tail    | 1,191E-09        |                  |
| t critical two tail | 2,0369333        |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.4.5 Short Product**

Inventory level and sales numbers are shown by table 43 for Short products for Akbati 's stores. Datas are obtained week by week. Inventory level is measured at the begining of the week. Sales numbers are the total sales number during that week.

**Table 43:** Akbati store's Short sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 60    | 178     | 60        | 178         |                |                  |
|       | 125   | 188     | 185       | 366         | 2,083333333    | 1,056179775      |
| 186   | 113   | 63      | 298       | 429         | 0,610810811    | 0,172131148      |
|       | 114   | 136     | 412       | 565         | 0,382550336    | 0,317016317      |
| 404   | 95    | 22      | 507       | 587         | 0,230582524    | 0,038938053      |
| 160   | 109   | 331     | 616       | 918         | 0,214990138    | 0,563884157      |
| 102   | 120   | 382     | 736       | 1.300       | 0,194805195    | 0,416122004      |
|       | 121   | 364     | 857       | 1.664       | 0,164402174    | 0,28             |
| 300   | 80    | 243     | 937       | 1.907       | 0,093348891    | 0,146033654      |
|       | 196   | 463     | 1.133     | 2.370       | 0,209178228    | 0,242789722      |
| 281   | 76    | 267     | 1.209     | 2.637       | 0,067078553    | 0,112658228      |
|       | 40    | 472     | 1.249     | 3.109       | 0,033085194    | 0,178991278      |
|       | 27    | 432     | 1.276     | 3.541       | 0,021617294    | 0,138951431      |
|       | 42    | 405     | 1.318     | 3.946       | 0,032915361    | 0,11437447       |
| 400   | 108   | 363     | 1.426     | 4.309       | 0,081942337    | 0,091991891      |
| 410   | 240   | 655     | 1.666     | 4.964       | 0,168302945    | 0,152007426      |
|       | 117   | 825     | 1.783     | 5.789       | 0,070228091    | 0,166196616      |
|       | 89    | 708     | 1.872     | 6.497       | 0,049915872    | 0,122300916      |
|       | 123   | 619     | 1.995     | 7.116       | 0,065705128    | 0,095274742      |
| 108   | 122   | 496     | 2.117     | 7.612       | 0,061152882    | 0,06970208       |
|       | 163   | 482     | 2.280     | 8.094       | 0,076995749    | 0,063321072      |
|       | 97    | 319     | 2.377     | 8.413       | 0,04254386     | 0,03941191       |
| 300   | 39    | 222     | 2.416     | 8.635       | 0,016407236    | 0,026387733      |
|       | 107   | 483     | 2.523     | 9.118       | 0,044288079    | 0,055935148      |
| 300   | 95    | 376     | 2.618     | 9.494       | 0,037653587    | 0,041237113      |
|       | 93    | 581     | 2.711     | 10.075      | 0,0355233      | 0,061196545      |
| 280   | 80    | 488     | 2.791     | 10.563      | 0,029509406    | 0,048436725      |
|       | 114   | 688     | 2.905     | 11.251      | 0,040845575    | 0,065133011      |
|       | 91    | 574     | 2.996     | 11.825      | 0,031325301    | 0,051017687      |
|       | 107   | 483     | 3.103     | 12.308      | 0,035714286    | 0,040845666      |
|       | 100   | 376     | 3.203     | 12.684      | 0,032226877    | 0,030549236      |
|       | 101   | 276     | 3.304     | 12.960      | 0,031532938    | 0,021759697      |
|       | 93    | 175     | 3.397     | 13.135      | 0,0281477      | 0,013503086      |

**Table 44:**Regression of Short sales change % and Inventory level change

| <i>Regression Statistics</i> |            |  |  |  |  |  |
|------------------------------|------------|--|--|--|--|--|
| Multiple R                   | 0,85638887 |  |  |  |  |  |
| R Square                     | 0,7334019  |  |  |  |  |  |
| Adjusted R Square            | 0,7245153  |  |  |  |  |  |
| Standart Error               | 0,19480774 |  |  |  |  |  |
| Observations                 | 32         |  |  |  |  |  |

| <i>ANOVA</i> |           |             |           |          |                     |  |
|--------------|-----------|-------------|-----------|----------|---------------------|--|
|              | <i>df</i> | <i>SS</i>   | <i>MS</i> | <i>F</i> | <i>Significance</i> |  |
| Regression   | 1         | 3,131977733 | 3,1319777 | 82,5289  | 4,075E-10           |  |
| Residual     | 30        | 1,138501694 | 0,0379501 |          |                     |  |
| Total        | 31        | 4,270479427 |           |          |                     |  |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,07822091          | 0,043702102           | -1,789866     | 0,08357        | -0,167473        | 0,01103069       |
| X1 variable | 1,55369397          | 0,171026087           | 9,0845437     | 4,1E-10        | 1,2044121        | 1,90297583       |

According to the results in Table 44, there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a relationship between variables ( $R = 0.85$ ). The specificity coefficient  $R^2$  is found to be 0.73, and it can be said that 73% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 1,55 branche in sales

**Table 45:** Results of T-Test on Sales of Akbati Short Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 175,2666667      | 102,93939        |
| Variance            | 7121,736667      | 1731,9337        |
| Observation         | 33               | 33               |
| Pearson Correlation | -0,105923929     |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 4,241073186      |                  |
| P(T<=t) one tail    | 8,85491E-05      |                  |
| t critical one tail | 1,693888748      |                  |
| P(T<=t) two tail    | 0,000177098      |                  |
| t critical two tail | 2,036933343      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.5. Gant Sanko Park Stores**

In Sanko 's stores 5 products are examined. First relationship between sales and inventory level are observed. Then inventory level is increased to see if number of unit sold give reaction to change of inventory level.

##### **4.5.1. Sock Product.**

Inventory level and sales numbers are shown by table 46 for socks products for Sanko 's stores. Datas are obtained week by week. Inventory level is measured at the beginning of the week. Sales numbers are the total sales number during that week.



**Table 46:** Sanko's sock's sales and Inventory level.

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
| 220   | 38    | 120     | 38        | 120         |                |                  |
|       | 93    | 302     | 131       | 422         | 2,447368421    | 2,516666667      |
| 300   | 46    | 209     | 177       | 631         | 0,351145038    | 0,495260664      |
|       | 41    | 463     | 218       | 1.094       | 0,231638418    | 0,733755943      |
|       | 45    | 422     | 263       | 1.516       | 0,206422018    | 0,385740402      |
|       | 98    | 377     | 361       | 1.893       | 0,372623574    | 0,248680739      |
| 400   | 116   | 279     | 477       | 2.172       | 0,32132964     | 0,147385103      |
|       | 100   | 188     | 577       | 2.360       | 0,209643606    | 0,086556169      |
| 500   | 110   | 88      | 687       | 2.448       | 0,190641248    | 0,037288136      |
|       | 103   | 478     | 790       | 2.926       | 0,14992722     | 0,195261438      |
|       | 80    | 375     | 870       | 3.301       | 0,101265823    | 0,128161312      |
|       | 139   | 295     | 1.009     | 3.596       | 0,159770115    | 0,089366859      |
|       | 59    | 156     | 1.068     | 3.752       | 0,058473736    | 0,043381535      |
| 500   | 96    | 97      | 1.164     | 3.849       | 0,08988764     | 0,025852878      |
|       | 103   | 501     | 1.267     | 4.350       | 0,088487973    | 0,130163679      |
|       | 77    | 398     | 1.344     | 4.748       | 0,060773481    | 0,091494253      |
|       | 49    | 321     | 1.393     | 5.069       | 0,036458333    | 0,067607414      |
|       | 58    | 272     | 1.451     | 5.341       | 0,041636755    | 0,053659499      |
|       | 48    | 214     | 1.499     | 5.555       | 0,033080634    | 0,040067403      |
|       | 94    | 166     | 1.593     | 5.721       | 0,062708472    | 0,029882988      |
| 400   | 25    | 72      | 1.618     | 5.793       | 0,01569366     | 0,012585212      |
|       | 66    | 447     | 1.684     | 6.240       | 0,0407911      | 0,077162092      |
|       | 60    | 381     | 1.744     | 6.621       | 0,035629454    | 0,061057692      |
|       | 55    | 321     | 1.799     | 6.942       | 0,031536697    | 0,048482102      |
|       | 30    | 266     | 1.829     | 7.208       | 0,016675931    | 0,038317488      |
|       | 20    | 236     | 1.849     | 7.444       | 0,010934937    | 0,032741398      |
|       | 33    | 216     | 1.882     | 7.660       | 0,017847485    | 0,029016658      |
|       | 24    | 183     | 1.906     | 7.843       | 0,012752391    | 0,023890339      |
|       | 38    | 159     | 1.944     | 8.002       | 0,019937041    | 0,020272855      |
|       | 46    | 121     | 1.990     | 8.123       | 0,023662551    | 0,01512122       |
|       | 26    | 75      | 2.016     | 8.198       | 0,013065327    | 0,009233042      |
|       | 45    | 49      | 2.061     | 8.247       | 0,022321429    | 0,005977068      |
|       | 31    | 4       | 2.092     | 8.251       | 0,015041242    | 0,000485025      |

**Table 47:**Regression of Sock sales change % and Inventory level change

| <i>Regression Statistics</i> |             |  |  |  |  |
|------------------------------|-------------|--|--|--|--|
| Multiple R                   | 0,967679898 |  |  |  |  |
| R Square                     | 0,936404384 |  |  |  |  |
| Adjusted R Square            | 0,934284531 |  |  |  |  |
| Standart Error               | 0,109790895 |  |  |  |  |
| Observations                 | 32          |  |  |  |  |

| <i>ANOVA</i> |           |             |           |          |                     |
|--------------|-----------|-------------|-----------|----------|---------------------|
|              | <i>df</i> | <i>SS</i>   | <i>MS</i> | <i>F</i> | <i>Significance</i> |
| Regression   | 1         | 5,324639046 | 5,325     | 441,731  | 1,6769E-19          |
| Residual     | 30        | 0,361621222 | 0,012     |          |                     |
| Total        | 31        | 5,686260268 |           |          |                     |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|
| Intercept   | 0,002517493         | 0,02100858            | 0,12          | 0,90542        | -0,0403878       |
| X1 variable | 0,913528054         | 0,043465345           | 21,02         | 1,7E-19        | 0,82475998       |

According to the results in Table 47, there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a relationship between variables ( $R = 0.96$ ). The specificity coefficient  $R^2$  is found to be 0.93, and it can be said that 93% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 0,91 branche in sales

**Table 48:** Results of T-Test on Sales of Sanko Sock Product

|                        | <i>New sales</i> | <i>Old sales</i> |
|------------------------|------------------|------------------|
| Mean                   | 69,73333333      | 63,39394         |
| Variance               | 1237,144792      | 1022,434         |
| Observation            | 33               | 33               |
| Pearson<br>Correlation | 1                |                  |
| Hypothesized<br>Mean   | 0                |                  |
| df                     | 32               |                  |
| t Stat                 | 11,3890403       |                  |
| P(T<=t) one tail       | 4,28869E-13      |                  |
| t critical one tail    | 1,693888748      |                  |
| P(T<=t) two tail       | 8,57737E-13      |                  |
| t critical two tail    | 2,036933343      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.5.2. Shoes Product.**

Inventory level and sales numbers are shown by table 49 for socks products for Sanko 's stores. Datas are obtained week by week. Inventory level is measured at the begining of the week. Sales numbers are the total sales number during that week.

**Table 49:** Sanko's Shoes's sales and Inventory level.

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 11    | 50      | 11        | 50          |                |                  |
|       | 29    | 39      | 40        | 89          | 2,636363636    | 0,78             |
|       | 9     | 10      | 49        | 99          | 0,225          | 0,112359551      |
|       | 5     | 151     | 54        | 250         | 0,102040816    | 1,525252525      |
|       | 9     | 146     | 63        | 396         | 0,166666667    | 0,584            |
|       | 92    | 137     | 155       | 533         | 1,46031746     | 0,345959596      |
|       | 112   | 45      | 267       | 578         | 0,722580645    | 0,084427767      |
|       | 159   | 188     | 426       | 766         | 0,595505618    | 0,325259516      |
| 500   | 131   | 529     | 557       | 1.295       | 0,307511737    | 0,690600522      |
|       | 105   | 398     | 662       | 1.693       | 0,188509874    | 0,307335907      |
|       | 100   | 793     | 762       | 2.486       | 0,151057402    | 0,468399291      |
|       | 76    | 693     | 838       | 3.179       | 0,099737533    | 0,278761062      |
|       | 100   | 617     | 938       | 3.796       | 0,119331742    | 0,194086191      |
|       | 97    | 517     | 1.035     | 4.313       | 0,103411514    | 0,136195996      |
| 400   | 111   | 420     | 1.146     | 4.733       | 0,107246377    | 0,097380014      |
|       | 94    | 309     | 1.240     | 5.042       | 0,082024433    | 0,065286288      |
|       | 45    | 615     | 1.285     | 5.657       | 0,036290323    | 0,121975407      |
|       | 34    | 570     | 1.319     | 6.227       | 0,026459144    | 0,10076012       |
|       | 45    | 536     | 1.364     | 6.763       | 0,034116755    | 0,086076762      |
|       | 38    | 491     | 1.402     | 7.254       | 0,027859238    | 0,072600917      |
|       | 131   | 453     | 1.533     | 7.707       | 0,093437946    | 0,062448304      |
|       | 39    | 322     | 1.572     | 8.029       | 0,025440313    | 0,0417802        |
| 500   | 53    | 283     | 1.625     | 8.312       | 0,033715013    | 0,035247229      |
|       | 12    | 230     | 1.637     | 8.542       | 0,007384615    | 0,027670837      |
|       | 21    | 718     | 1.658     | 9.260       | 0,012828345    | 0,084055256      |
|       | 23    | 697     | 1.681     | 9.957       | 0,013872135    | 0,075269978      |
|       | 19    | 674     | 1.700     | 10.631      | 0,011302796    | 0,067691072      |
|       | 21    | 655     | 1.721     | 11.286      | 0,012352941    | 0,061612266      |
|       | 26    | 634     | 1.747     | 11.920      | 0,015107496    | 0,056175793      |
|       | 19    | 608     | 1.766     | 12.528      | 0,010875787    | 0,051006711      |
|       | 17    | 589     | 1.783     | 13.117      | 0,009626274    | 0,047014687      |
|       | 19    | 572     | 1.802     | 13.689      | 0,010656197    | 0,043607532      |
|       | 2     | 553     | 1.804     | 14.242      | 0,001109878    | 0,040397399      |

**Table 50:**Regression of Shoe sales change % and Inventory level change

| <i>Regression Statistics</i> |             |  |  |  |  |  |
|------------------------------|-------------|--|--|--|--|--|
| Multiple R                   | 0,376371592 |  |  |  |  |  |
| R Square                     | 0,141655576 |  |  |  |  |  |
| Adjusted R Square            | 0,113044095 |  |  |  |  |  |
| Standart Error               | 0,291760659 |  |  |  |  |  |
| Observations                 | 32          |  |  |  |  |  |

| <i>ANOVA</i> |           |             |           |          |                     |  |
|--------------|-----------|-------------|-----------|----------|---------------------|--|
|              | <i>df</i> | <i>SS</i>   | <i>MS</i> | <i>F</i> | <i>Significance</i> |  |
| Regression   | 1         | 0,421450719 | 0,421451  | 4,951    | 0,03374183          |  |
| Residual     | 30        | 2,553728462 | 0,085124  |          |                     |  |
| Total        | 31        | 2,975179181 |           |          |                     |  |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,169229574         | 0,056574032           | 2,991294      | 0,00551        | 0,05368999       | 0,28476916       |
| X1 variable | 0,222202143         | 0,099862303           | 2,225085      | 0,03374        | 0,01825611       | 0,42614817       |

According to the results in Table 50, there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a relationship between variables ( $R = 0.37$ ). The specificity coefficient  $R^2$  is found to be 0.14, and it can be said that 14% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branche changes in the stock will cause a change of 0,22 branche in sales

**Table 51:** Results of T-Test on Sales of SankoShoe Product

|                        | <i>New sales</i> | <i>Old sales</i> |
|------------------------|------------------|------------------|
| Mean                   | 109,3333333      | 54,66666667      |
| Variance               | 8136,916667      | 2034,229167      |
| Observation            | 33               | 33               |
| Pearson<br>Correlation | 1                |                  |
| Hypothesized<br>Mean   | 0                |                  |
| df                     | 32               |                  |
| t Stat                 | 6,962731128      |                  |
| P(T<=t) one tail       | 3,45424E-08      |                  |
| t critical one tail    | 1,693888748      |                  |
| P(T<=t) two tail       | 6,90848E-08      |                  |
| t critical two tail    | 2,036933343      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.5.3.T-shirt Product.**

Inventory level and sales numbers are shown by table 52 for T-shirt product for Sanko Park's stores. Datas are obtained week by week. Inventory level is measured at the beginning of the week. Sales numbers are the total sales number during that week

**Table 52:** Sanko's T-shirt's Sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 27    | 50      | 27        | 50          |                |                  |
| 60    | 41    | 23      | 68        | 73          | 1,518518519    | 0,46             |
| 60    | 30    | 42      | 98        | 115         | 0,441176471    | 0,575342466      |
|       | 57    | 72      | 155       | 187         | 0,581632653    | 0,626086957      |
| 180   | 49    | 15      | 204       | 202         | 0,316129032    | 0,080213904      |
|       | 55    | 146     | 259       | 348         | 0,269607843    | 0,722772277      |
| 150   | 74    | 91      | 333       | 439         | 0,285714286    | 0,261494253      |
|       | 76    | 188     | 409       | 627         | 0,228228228    | 0,428246014      |
| 420   | 72    | 112     | 481       | 739         | 0,17603912     | 0,178628389      |
|       | 57    | 460     | 538       | 1.199       | 0,118503119    | 0,622462788      |
|       | 99    | 403     | 637       | 1.602       | 0,18401487     | 0,336113428      |
| 150   | 80    | 304     | 717       | 1.906       | 0,125588697    | 0,189762797      |
|       | 101   | 374     | 818       | 2.280       | 0,140864714    | 0,196222455      |
| 210   | 81    | 273     | 899       | 2.553       | 0,099022005    | 0,119736842      |
|       | 100   | 402     | 999       | 2.955       | 0,111234705    | 0,15746181       |
|       | 91    | 302     | 1.090     | 3.257       | 0,091091091    | 0,102199662      |
|       | 73    | 211     | 1.163     | 3.468       | 0,066972477    | 0,064783543      |
|       | 66    | 138     | 1.229     | 3.606       | 0,056749785    | 0,039792388      |
| 240   | 74    | 72      | 1.303     | 3.678       | 0,060211554    | 0,019966722      |
| 150   | 74    | 238     | 1.377     | 3.916       | 0,056792018    | 0,064709081      |
| 300   | 72    | 314     | 1.449     | 4.230       | 0,052287582    | 0,080183861      |
|       | 62    | 542     | 1.511     | 4.772       | 0,04278813     | 0,128132388      |
|       | 55    | 480     | 1.566     | 5.252       | 0,036399735    | 0,100586756      |
|       | 54    | 425     | 1.620     | 5.677       | 0,034482759    | 0,080921554      |
|       | 57    | 371     | 1.677     | 6.048       | 0,035185185    | 0,065351418      |
|       | 37    | 314     | 1.714     | 6.362       | 0,022063208    | 0,051917989      |
|       | 37    | 277     | 1.751     | 6.639       | 0,021586931    | 0,043539767      |
|       | 61    | 240     | 1.812     | 6.879       | 0,034837236    | 0,036150023      |
| 240   | 60    | 179     | 1.872     | 7.058       | 0,033112583    | 0,026021224      |
|       | 41    | 359     | 1.913     | 7.417       | 0,021901709    | 0,050864267      |
|       | 64    | 318     | 1.977     | 7.735       | 0,033455306    | 0,042874478      |
|       | 49    | 254     | 2.026     | 7.989       | 0,024785028    | 0,03283775       |
|       | 25    | 205     | 2.051     | 8.194       | 0,012339585    | 0,025660283      |

**Table 53:**Regression of T-shirt sales change % and Inventory level change

| <i>Regression Statistics</i> |             |  |  |  |  |  |
|------------------------------|-------------|--|--|--|--|--|
| Multiple R                   | 0,561946917 |  |  |  |  |  |
| R Square                     | 0,315784338 |  |  |  |  |  |
| Adjusted R Square            | 0,292977149 |  |  |  |  |  |
| Standart Error               | 0,235407126 |  |  |  |  |  |
| Observations                 | 32          |  |  |  |  |  |

| <i>ANOVA</i> |           |             |           |          |                     |  |
|--------------|-----------|-------------|-----------|----------|---------------------|--|
|              | <i>df</i> | <i>SS</i>   | <i>MS</i> | <i>F</i> | <i>Significance</i> |  |
| Regression   | 1         | 0,767287351 | 0,767287  | 13,8458  | 0,00081695          |  |
| Residual     | 30        | 1,662495444 | 0,055417  |          |                     |  |
| Total        | 31        | 2,429782795 |           |          |                     |  |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,022870845         | 0,056790374           | 0,402724      | 0,69001        | -0,0931106       | 0,13885226       |
| X1 variable | 0,765499982         | 0,205724384           | 3,720998      | 0,00082        | 0,34535474       | 1,18564522       |

According to the results in Table 53, there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a relationship between variables ( $R = 0.56$ ). The specificity coefficient  $R^2$  is found to be 0.31, and it can be said that 31% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 0,76 branche in sales



**Table 54:** Results of T-Test on Sales of Sanko T-shirt Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 118,087879       | 62,1515          |
| Variance            | 1484,41422       | 411,195          |
| Observation         | 33               | 33               |
| Pearson Correlation | 1                |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 17,6069746       |                  |
| P(T<=t) one tail    | 2,5283E-18       |                  |
| t critical one tail | 1,69388875       |                  |
| P(T<=t) two tail    | 5,0567E-18       |                  |
| t critical two tail | 2,03693334       |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.5.4.Hoodie Product.**

Inventory level and sales numbers are shown by table 55 for Hoodie product for Sanko Park's stores. Datas are obtained week by week. Inventory level is measured at the beginning of the week. Sales numbers are the total sales number during that week

**Table 55:** Sanko's Hoodie's Sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 74    | 128     | 74        | 128         |                |                  |
| 91    | 83    | 54      | 157       | 182         | 1,121621622    | 0,421875         |
| 400   | 25    | 62      | 182       | 244         | 0,159235669    | 0,340659341      |
|       | 167   | 437     | 349       | 681         | 0,917582418    | 1,790983607      |
|       | 90    | 270     | 439       | 951         | 0,257879656    | 0,396475771      |
|       | 147   | 180     | 586       | 1.131       | 0,334851936    | 0,189274448      |
| 390   | 143   | 33      | 729       | 1.164       | 0,244027304    | 0,029177719      |
| 500   | 180   | 188     | 909       | 1.352       | 0,24691358     | 0,161512027      |
|       | 166   | 508     | 1.075     | 1.860       | 0,182618262    | 0,375739645      |
|       | 84    | 342     | 1.159     | 2.202       | 0,078139535    | 0,183870968      |
|       | 77    | 258     | 1.236     | 2.460       | 0,066436583    | 0,117166213      |
|       | 77    | 181     | 1.313     | 2.641       | 0,062297735    | 0,073577236      |
|       | 34    | 104     | 1.347     | 2.745       | 0,025894897    | 0,039379023      |
| 400   | 25    | 70      | 1.372     | 2.815       | 0,018559762    | 0,025500911      |
|       | 64    | 445     | 1.436     | 3.260       | 0,04664723     | 0,158081705      |
|       | 82    | 381     | 1.518     | 3.641       | 0,057103064    | 0,116871166      |
|       | 99    | 299     | 1.617     | 3.940       | 0,065217391    | 0,082120297      |
|       | 53    | 200     | 1.670     | 4.140       | 0,032776747    | 0,050761421      |
| 300   | 69    | 147     | 1.739     | 4.287       | 0,041317365    | 0,035507246      |
|       | 55    | 378     | 1.794     | 4.665       | 0,031627372    | 0,088173548      |
|       | 53    | 323     | 1.847     | 4.988       | 0,029542921    | 0,069239014      |
|       | 70    | 270     | 1.917     | 5.258       | 0,037899296    | 0,054129912      |
|       | 63    | 200     | 1.980     | 5.458       | 0,03286385     | 0,038037277      |
|       | 66    | 137     | 2.046     | 5.595       | 0,033333333    | 0,02510077       |
| 400   | 72    | 71      | 2.118     | 5.666       | 0,035190616    | 0,012689902      |
|       | 140   | 399     | 2.258     | 6.065       | 0,066100094    | 0,070420049      |
| 191   | 89    | 259     | 2.347     | 6.324       | 0,039415412    | 0,04270404       |
|       | 92    | 361     | 2.439     | 6.685       | 0,039198977    | 0,057084124      |
|       | 93    | 269     | 2.532     | 6.954       | 0,038130381    | 0,040239342      |
|       | 74    | 176     | 2.606     | 7.130       | 0,029225908    | 0,025309175      |
| 380   | 67    | 102     | 2.673     | 7.232       | 0,0257099      | 0,01430575       |
|       | 24    | 415     | 2.697     | 7.647       | 0,008978676    | 0,05738385       |
|       | 43    | 391     | 2.740     | 8.038       | 0,015943641    | 0,051131163      |

**Table 56:**Regression of Hoodie sales change % and Inventory level change

| <i>Regression Statistics</i> |             |
|------------------------------|-------------|
| Multiple R                   | 0,738215109 |
| R Square                     | 0,544961547 |
| Adjusted R Square            | 0,529793598 |
| Standart Error               | 0,16940806  |
| Observations                 | 32          |

| ANOVA      |           |             |            |          |                     |
|------------|-----------|-------------|------------|----------|---------------------|
|            | <i>df</i> | <i>SS</i>   | <i>MS</i>  | <i>F</i> | <i>Significance</i> |
| Regression | 1         | 1,031115114 | 1,03111511 | 35,9285  | 1,4177E-06          |
| Residual   | 30        | 0,860972723 | 0,02869909 |          |                     |
| Total      | 31        | 1,892087837 |            |          |                     |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,044564363         | 0,033776579           | 1,31938652    | 0,19702        | -0,0244166       | 0,11354534       |
| X1 variable | 0,572400806         | 0,095495021           | 5,99403821    | 1,4E-06        | 0,37737395       | 0,76742766       |

According to the results in Table 56, there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a relationship between variables ( $R = 0.73$ ). The specificity coefficient  $R^2$  is found to be 0.54, and it can be said that 54% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 0,57 branche in sales

**Table 57:** Results of T-Test on Sales of Sanko Hoodie Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 124,5454545      | 83,030303        |
| Variance            | 3771,771307      | 1676,3428        |
| Observation         | 33               | 33               |
| Pearson             |                  |                  |
| Correlation         | 1                |                  |
| Hypothesized        |                  |                  |
| Mean                | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 11,64963117      |                  |
| P(T<=t) one tail    | 2,38366E-13      |                  |
| t critical one tail | 1,693888748      |                  |
| P(T<=t) two tail    | 4,76733E-13      |                  |
| t critical two tail | 2,036933343      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.5.5.Short Product**

Inventory level and sales numbers are shown by table 58 for Short product for Sanko Park's stores. Datas are obtained week by week. Inventory level is measured at the beginning of the week. Sales numbers are the total sales number during that week

**Table 58:** Sanko's Short's Sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 21    | 91      | 21        | 91          |                |                  |
|       | 50    | 70      | 71        | 161         | 2,380952381    | 0,769230769      |
| 100   | 36    | 20      | 107       | 181         | 0,507042254    | 0,124223602      |
|       | 37    | 84      | 144       | 265         | 0,345794393    | 0,464088398      |
| 100   | 45    | 47      | 189       | 312         | 0,3125         | 0,177358491      |
|       | 96    | 102     | 285       | 414         | 0,507936508    | 0,326923077      |
| 300   | 116   | 6       | 401       | 420         | 0,407017544    | 0,014492754      |
| 300   | 99    | 188     | 500       | 608         | 0,246882793    | 0,447619048      |
|       | 93    | 389     | 593       | 997         | 0,186          | 0,639802632      |
|       | 73    | 296     | 666       | 1.293       | 0,123102867    | 0,296890672      |
| 200   | 79    | 223     | 745       | 1.516       | 0,118618619    | 0,172467131      |
|       | 62    | 344     | 807       | 1.860       | 0,083221477    | 0,226912929      |
|       | 46    | 282     | 853       | 2.142       | 0,057001239    | 0,151612903      |
|       | 56    | 236     | 909       | 2.378       | 0,065650645    | 0,110177404      |
|       | 62    | 180     | 971       | 2.558       | 0,068206821    | 0,07569386       |
| 200   | 85    | 118     | 1.056     | 2.676       | 0,08753862     | 0,046129789      |
|       | 78    | 233     | 1.134     | 2.909       | 0,073863636    | 0,087070254      |
|       | 133   | 155     | 1.267     | 3.064       | 0,117283951    | 0,053282915      |
| 300   | 61    | 22      | 1.328     | 3.086       | 0,048145225    | 0,007180157      |
| 150   | 90    | 261     | 1.418     | 3.347       | 0,067771084    | 0,084575502      |
| 200   | 122   | 321     | 1.540     | 3.668       | 0,086036671    | 0,095906782      |
|       | 129   | 399     | 1.669     | 4.067       | 0,083766234    | 0,108778626      |
|       | 133   | 270     | 1.802     | 4.337       | 0,079688436    | 0,066388001      |
|       | 70    | 137     | 1.872     | 4.474       | 0,038845727    | 0,031588656      |
| 200   | 51    | 67      | 1.923     | 4.541       | 0,02724359     | 0,014975414      |
|       | 36    | 216     | 1.959     | 4.757       | 0,018720749    | 0,047566615      |
|       | 30    | 180     | 1.989     | 4.937       | 0,015313936    | 0,037838974      |
|       | 62    | 150     | 2.051     | 5.087       | 0,031171443    | 0,030382824      |
| 247   | 88    | 88      | 2.139     | 5.175       | 0,0429059      | 0,017298997      |
|       | 25    | 247     | 2.164     | 5.422       | 0,011687705    | 0,047729469      |
|       | 29    | 222     | 2.193     | 5.644       | 0,013401109    | 0,040944301      |
|       | 55    | 193     | 2.248     | 5.837       | 0,025079799    | 0,034195606      |
|       | 51    | 138     | 2.299     | 5.975       | 0,022686833    | 0,023642282      |

**Table 59:**Regression of Short sales change % and Inventory level change

| <i>Regression Statistics</i> |             |
|------------------------------|-------------|
| Multiple R                   | 0,691241123 |
| R Square                     | 0,47781429  |
| Adjusted R Square            | 0,460408099 |
| Standart Error               | 0,310301084 |
| Observations                 | 32          |

| ANOVA      |           |             |            |          |                     |
|------------|-----------|-------------|------------|----------|---------------------|
|            | <i>df</i> | <i>SS</i>   | <i>MS</i>  | <i>F</i> | <i>Significance</i> |
| Regression | 1         | 2,643151097 | 2,6431511  | 27,4508  | 1,185E-05           |
| Residual   | 30        | 2,888602881 | 0,09628676 |          |                     |
| Total      | 31        | 5,531753978 |            |          |                     |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | -0,039577264        | 0,071037053           | -0,5571355    | 0,58157        | -0,1846543       | 0,10549975       |
| X1 variable | 1,552965119         | 0,296403958           | 5,23935351    | 1,2E-05        | 0,94762748       | 2,15830276       |

According to the results in Table 59 there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a relationship between variables ( $R = 0.69$ ). The specificity coefficient  $R^2$  is found to be 0.47, and it can be said that 47% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 1,55 branche in sales

**Table 60:** Results of T-Test on Sales of Sanko Short Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 111,4666667      | 69,6666667       |
| Variance            | 2680,746667      | 1047,16667       |
| Observation         | 33               | 33               |
| Pearson             |                  |                  |
| Correlation         | 1                |                  |
| Hypothesized        |                  |                  |
| Mean                | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 12,36727724      |                  |
| P(T<=t) one tail    | 4,93296E-14      |                  |
| t critical one tail | 1,693888748      |                  |
| P(T<=t) two tail    | 9,86592E-14      |                  |
| t critical two tail | 2,036933343      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.6. Ist Forum Stores**

In Forum 's stores 5 products are examined. First relationship between sales and inventory level are observed. Then inventory level is increased to see if number of unit sold give reaction to change of inventory level.

##### **4.6.1. Sock Product.**

Inventory level and sales numbers are shown by table 61 for socks products for Sanko 's stores. Datas are obtained week by week. Inventory level is measured at the begining of the week. Sales numbers are the total sales number during that week.

**Table 61:** Forum's Sock's Sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 26    | 101     | 26        | 101         |                |                  |
| 60    | 75    | 75      | 101       | 176         | 2,884615385    | 0,742574257      |
| 170   | 26    | 60      | 127       | 236         | 0,257425743    | 0,340909091      |
|       | 57    | 204     | 184       | 440         | 0,448818898    | 0,86440678       |
|       | 37    | 147     | 221       | 587         | 0,201086957    | 0,334090909      |
|       | 101   | 110     | 322       | 697         | 0,457013575    | 0,187393526      |
| 400   | 94    | 9       | 416       | 706         | 0,291925466    | 0,012912482      |
|       | 106   | 315     | 522       | 1.021       | 0,254807692    | 0,446175637      |
| 400   | 69    | 209     | 591       | 1.230       | 0,132183908    | 0,204701273      |
|       | 122   | 540     | 713       | 1.770       | 0,20642978     | 0,43902439       |
|       | 70    | 418     | 783       | 2.188       | 0,098176718    | 0,236158192      |
|       | 55    | 348     | 838       | 2.536       | 0,070242656    | 0,15904936       |
| 100   | 85    | 293     | 923       | 2.829       | 0,101431981    | 0,115536278      |
|       | 77    | 308     | 1.000     | 3.137       | 0,083423619    | 0,108872393      |
|       | 86    | 231     | 1.086     | 3.368       | 0,086          | 0,073637233      |
| 300   | 79    | 145     | 1.165     | 3.513       | 0,072744015    | 0,043052257      |
|       | 33    | 366     | 1.198     | 3.879       | 0,02832618     | 0,104184458      |
|       | 36    | 333     | 1.234     | 4.212       | 0,030050083    | 0,085846868      |
|       | 54    | 297     | 1.288     | 4.509       | 0,04376013     | 0,070512821      |
|       | 48    | 243     | 1.336     | 4.752       | 0,037267081    | 0,053892216      |
|       | 34    | 195     | 1.370     | 4.947       | 0,025449102    | 0,041035354      |
| 250   | 55    | 161     | 1.425     | 5.108       | 0,040145985    | 0,032544977      |
|       | 40    | 356     | 1.465     | 5.464       | 0,028070175    | 0,069694597      |
|       | 30    | 316     | 1.495     | 5.780       | 0,020477816    | 0,057833089      |
| 100   | 79    | 286     | 1.574     | 6.066       | 0,052842809    | 0,049480969      |
|       | 33    | 307     | 1.607     | 6.373       | 0,020965693    | 0,050609957      |
| 250   | 21    | 274     | 1.628     | 6.647       | 0,013067828    | 0,04299388       |
|       | 47    | 503     | 1.675     | 7.150       | 0,028869779    | 0,075673236      |
|       | 65    | 456     | 1.740     | 7.606       | 0,03880597     | 0,063776224      |
|       | 28    | 391     | 1.768     | 7.997       | 0,016091954    | 0,051406784      |
| 250   | 31    | 363     | 1.799     | 8.360       | 0,017533937    | 0,045392022      |
|       | 42    | 582     | 1.841     | 8.942       | 0,023346304    | 0,069617225      |
|       | 27    | 540     | 1.868     | 9.482       | 0,014665942    | 0,060389175      |



**Table 62:**Regression of Short sales change % and Inventory level change

| <i>Regression Statistics</i> |             |
|------------------------------|-------------|
| Multiple R                   | 0,65038582  |
| R Square                     | 0,423001715 |
| Adjusted R Square            | 0,403768439 |
| Standart Error               | 0,390673971 |
| Observations                 | 32          |

| <i>ANOVA</i> |           |             |            |          |                     |
|--------------|-----------|-------------|------------|----------|---------------------|
|              | <i>df</i> | <i>SS</i>   | <i>MS</i>  | <i>F</i> | <i>Significance</i> |
| Regression   | 1         | 3,356740855 | 3,35674086 | 21,9932  | 5,588E-05           |
| Residual     | 30        | 4,578784542 | 0,15262615 |          |                     |
| Total        | 31        | 7,935525397 |            |          |                     |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | -0,077728935        | 0,089798876           | 0,86558918    | 0,39359        | -0,2611227       | 0,10566484       |
| X1 variable | 1,614996956         | 0,34437156            | 4,68969318    | 5,6E-05        | 0,91169641       | 2,31829751       |

According to the results in Table 62 there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a relationship between variables ( $R = 0.65$ ). The specificity coefficient  $R^2$  is found to be 0.42, and it can be said that 42% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 1,61 branche in sales

**Table 63:** Results of T-Test on Sales of Sanko Short Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 73,58787879      | 56,60606061      |
| Variance            | 1226,194223      | 725,5587121      |
| Observation         | 33               | 33               |
| Pearson             |                  |                  |
| Correlation         | 1                |                  |
| Hypothesized        |                  |                  |
| Mean                | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 12,07212216      |                  |
| P(T<=t) one tail    | 9,3599E-14       |                  |
| t critical one tail | 1,693888748      |                  |
| P(T<=t) two tail    | 1,87198E-13      |                  |
| t critical two tail | 2,036933343      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.5.2. Shoes Product.**

Inventory level and sales numbers are shown by table 64 for socks products for Sanko 's stores. Datas are obtained week by week. Inventory level is measured at the begining of the week. Sales numbers are the total sales number during that week.

**Table 64:** Forum's Shoe's Sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 41    | 80      | 41        | 80          |                |                  |
|       | 37    | 39      | 78        | 119         | 0,902439024    | 0,4875           |
| 150   | 47    | 2       | 125       | 121         | 0,602564103    | 0,016806723      |
|       | 50    | 105     | 175       | 226         | 0,4            | 0,867768595      |
| 100   | 50    | 55      | 225       | 281         | 0,285714286    | 0,243362832      |
|       | 55    | 105     | 280       | 386         | 0,244444444    | 0,37366548       |
| 100   | 72    | 50      | 352       | 436         | 0,257142857    | 0,129533679      |
| 352   | 86    | 78      | 438       | 514         | 0,244318182    | 0,178899083      |
| 50    | 75    | 344     | 513       | 858         | 0,171232877    | 0,6692607        |
|       | 94    | 319     | 607       | 1.177       | 0,183235867    | 0,371794872      |
| 100   | 131   | 225     | 738       | 1.402       | 0,215815486    | 0,191163976      |
| 100   | 86    | 194     | 824       | 1.596       | 0,116531165    | 0,138373752      |
| 50    | 78    | 208     | 902       | 1.804       | 0,094660194    | 0,130325815      |
| 124   | 70    | 180     | 972       | 1.984       | 0,077605322    | 0,099778271      |
| 151   | 72    | 234     | 1.044     | 2.218       | 0,074074074    | 0,117943548      |
| 61    | 107   | 313     | 1.151     | 2.531       | 0,102490421    | 0,141118124      |
| 50    | 71    | 267     | 1.222     | 2.798       | 0,061685491    | 0,1054919        |
|       | 47    | 246     | 1.269     | 3.044       | 0,038461538    | 0,087919943      |
|       | 51    | 199     | 1.320     | 3.243       | 0,040189125    | 0,065374507      |
|       | 26    | 148     | 1.346     | 3.391       | 0,01969697     | 0,045636756      |
| 58    | 24    | 122     | 1.370     | 3.513       | 0,017830609    | 0,035977588      |
|       | 35    | 156     | 1.405     | 3.669       | 0,025547445    | 0,04440649       |
|       | 41    | 121     | 1.446     | 3.790       | 0,029181495    | 0,032979013      |
|       | 20    | 80      | 1.466     | 3.870       | 0,013831259    | 0,021108179      |
| 400   | 55    | 60      | 1.521     | 3.930       | 0,037517053    | 0,015503876      |
|       | 82    | 405     | 1.603     | 4.335       | 0,0539119      | 0,103053435      |
|       | 77    | 323     | 1.680     | 4.658       | 0,048034934    | 0,074509804      |
| 400   | 63    | 246     | 1.743     | 4.904       | 0,0375         | 0,052812366      |
|       | 90    | 583     | 1.833     | 5.487       | 0,051635112    | 0,118882545      |
|       | 111   | 493     | 1.944     | 5.980       | 0,060556465    | 0,089848733      |
|       | 117   | 382     | 2.061     | 6.362       | 0,060185185    | 0,063879599      |
|       | 110   | 265     | 2.171     | 6.627       | 0,053372149    | 0,041653568      |
|       | 109   | 155     | 2.280     | 6.782       | 0,050207278    | 0,023389166      |

**Table 65:**Regression of Shoe sales change % and Inventory level change

| <i>Regression Statistics</i> |            |
|------------------------------|------------|
| Multiple R                   | 0,53236142 |
| R Square                     | 0,28340868 |
| Adjusted R Square            | 0,25952231 |
| Standart Error               | 0,1627839  |
| Observations                 | 32         |

| <i>ANOVA</i> |           |             |           |          |                     |
|--------------|-----------|-------------|-----------|----------|---------------------|
|              | <i>df</i> | <i>SS</i>   | <i>MS</i> | <i>F</i> | <i>Significance</i> |
| Regression   | 1         | 0,314402333 | 0,3144    | 11,8649  | 0,00171046          |
| Residual     | 30        | 0,794957934 | 0,0265    |          |                     |
| Total        | 31        | 1,109360267 |           |          |                     |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,06245524          | 0,037632154           | 1,65962       | 0,10741        | -0,0143999       | 0,13931035       |
| X1 variable | 0,51605937          | 0,149819463           | 3,44454       | 0,00171        | 0,21008721       | 0,82203154       |

According to the results in Table 65 there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a relationship between variables ( $R = 0.53$ ). The specificity coefficient  $R^2$  is found to be 0.28, and it can be said that 42% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 0,51 branche in sales

**Table 66:** Results of T-Test on Sales of Forum Shoe Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 114,6878788      | 69,0909          |
| Variance            | 2314,613598      | 847,46           |
| Observation         | 33               | 33               |
| Pearson             |                  |                  |
| Correlation         | 0,762740824      |                  |
| Hypothesized        |                  |                  |
| Mean                | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 8,179233653      |                  |
| P(T<=t) one tail    | 1,21109E-09      |                  |
| t critical one tail | 1,693888748      |                  |
| P(T<=t) two tail    | 2,42218E-09      |                  |
| t critical two tail | 2,036933343      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.5.3.T-shirt Product**

Inventory level and sales numbers are shown by table 67 for socks products for Sanko 's stores. Datas are obtained week by week. Inventory level is measured at the beginning of the week. Sales numbers are the total sales number during that week.

**Table 67:** Forum's T-shirt's Sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
|       | 32    | 96      | 32        | 96          |                |                  |
|       | 52    | 64      | 84        | 160         | 1,625          | 0,666666667      |
| 200   | 40    | 12      | 124       | 172         | 0,476190476    | 0,075            |
|       | 43    | 172     | 167       | 344         | 0,346774194    | 1                |
|       | 56    | 129     | 223       | 473         | 0,335329341    | 0,375            |
| 200   | 109   | 73      | 332       | 546         | 0,488789238    | 0,154334038      |
| 200   | 94    | 164     | 426       | 710         | 0,28313253     | 0,3003663        |
|       | 134   | 270     | 560       | 980         | 0,314553991    | 0,38028169       |
| 300   | 73    | 136     | 633       | 1.116       | 0,130357143    | 0,13877551       |
|       | 122   | 363     | 755       | 1.479       | 0,192733017    | 0,325268817      |
|       | 93    | 241     | 848       | 1.720       | 0,123178808    | 0,162947938      |
|       | 117   | 148     | 965       | 1.868       | 0,137971698    | 0,086046512      |
| 600   | 23    | 31      | 988       | 1.899       | 0,023834197    | 0,016595289      |
|       | 52    | 608     | 1.040     | 2.507       | 0,052631579    | 0,32016851       |
|       | 86    | 556     | 1.126     | 3.063       | 0,082692308    | 0,221779019      |
|       | 97    | 470     | 1.223     | 3.533       | 0,086145648    | 0,153444336      |
|       | 57    | 373     | 1.280     | 3.906       | 0,046606705    | 0,105575998      |
|       | 75    | 316     | 1.355     | 4.222       | 0,05859375     | 0,080901178      |
|       | 57    | 241     | 1.412     | 4.463       | 0,042066421    | 0,057081952      |
|       | 43    | 184     | 1.455     | 4.647       | 0,030453258    | 0,041227874      |
|       | 30    | 141     | 1.485     | 4.788       | 0,020618557    | 0,030342156      |
|       | 76    | 111     | 1.561     | 4.899       | 0,051178451    | 0,023182957      |
|       | 6     | 35      | 1.567     | 4.934       | 0,00384369     | 0,007144315      |
| 500   | 4     | 29      | 1.571     | 4.963       | 0,002552648    | 0,005877584      |
|       | 30    | 525     | 1.601     | 5.488       | 0,019096117    | 0,105782793      |
|       | 15    | 495     | 1.616     | 5.983       | 0,009369144    | 0,090196793      |
|       | 17    | 480     | 1.633     | 6.463       | 0,010519802    | 0,080227311      |
|       | 19    | 463     | 1.652     | 6.926       | 0,011635028    | 0,071638558      |
|       | 20    | 444     | 1.672     | 7.370       | 0,012106538    | 0,064106266      |
|       | 19    | 424     | 1.691     | 7.794       | 0,011363636    | 0,057530529      |
|       | 23    | 405     | 1.714     | 8.199       | 0,013601419    | 0,051963048      |
|       | 19    | 382     | 1.733     | 8.581       | 0,011085181    | 0,046591048      |
|       | 41    | 363     | 1.774     | 8.944       | 0,023658396    | 0,042302762      |

**Table 68:**Regression of Shoe sales change % and Inventory level change

| <i>Regression Statistics</i> |             |  |  |  |  |  |
|------------------------------|-------------|--|--|--|--|--|
| Multiple R                   | 0,615780909 |  |  |  |  |  |
| R Square                     | 0,379186128 |  |  |  |  |  |
| Adjusted R Square            | 0,358492332 |  |  |  |  |  |
| Standart Error               | 0,242065143 |  |  |  |  |  |
| Observations                 | 32          |  |  |  |  |  |

| <i>ANOVA</i> |           |             |           |          |                     |  |
|--------------|-----------|-------------|-----------|----------|---------------------|--|
|              | <i>df</i> | <i>SS</i>   | <i>MS</i> | <i>F</i> | <i>Significance</i> |  |
| Regression   | 1         | 1,073684774 | 1,07368   | 18,3237  | 0,00017568          |  |
| Residual     | 30        | 1,757866002 | 0,0586    |          |                     |  |
| Total        | 31        | 2,831550776 |           |          |                     |  |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | 0,010585549         | 0,055027101           | 0,19237       | 0,84875        | -0,1017948       | 0,12296588       |
| X1 variable | 0,887713868         | 0,207379997           | 4,28061       | 0,00018        | 0,46418741       | 1,31124032       |

According to the results in Table 68 there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a relationship between variables ( $R = 0.61$ ). The specificity coefficient  $R^2$  is found to be 0.37, and it can be said that 37% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 0,88 branche in sales

**Table 69:** Results of T-Test on Sales of Forum T-shirt Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 64,50909091      | 53,7576          |
| Variance            | 1890,722727      | 1313             |
| Observation         | 33               | 33               |
| Pearson Correlation | 1                |                  |
| Hypothesized Mean   | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 8,522440332      |                  |
| P(T<=t) one tail    | 4,85862E-10      |                  |
| t critical one tail | 1,693888748      |                  |
| P(T<=t) two tail    | 9,71723E-10      |                  |
| t critical two tail | 2,036933343      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.5.4.Hoodie Product**

Inventory level and sales numbers are shown by table 70 for Hoodie products for Sanko 's stores. Datas are obtained week by week. Inventory level is measured at the beginning of the week. Sales numbers are the total sales number during that week.



**Table 70:** Forum's Hoodie's Sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
| 235   | 62    | 96      | 62        | 96          |                |                  |
| 294   | 234   | 269     | 296       | 365         | 3,774193548    | 2,802083333      |
| 190   | 103   | 329     | 399       | 694         | 0,347972973    | 0,901369863      |
|       | 50    | 416     | 449       | 1.110       | 0,125313283    | 0,599423631      |
|       | 36    | 366     | 485       | 1.476       | 0,080178174    | 0,32972973       |
|       | 164   | 330     | 649       | 1.806       | 0,33814433     | 0,223577236      |
| 454   | 113   | 166     | 762       | 1.972       | 0,174114022    | 0,091915836      |
| 416   | 170   | 507     | 932       | 2.479       | 0,223097113    | 0,257099391      |
|       | 80    | 753     | 1.012     | 3.232       | 0,08583691     | 0,303751513      |
|       | 110   | 673     | 1.122     | 3.905       | 0,108695652    | 0,208230198      |
| 199   | 135   | 563     | 1.257     | 4.468       | 0,120320856    | 0,144174136      |
| 300   | 107   | 627     | 1.364     | 5.095       | 0,085123309    | 0,140331244      |
|       | 57    | 820     | 1.421     | 5.915       | 0,041788856    | 0,1609421        |
|       | 34    | 763     | 1.455     | 6.678       | 0,023926812    | 0,128994083      |
|       | 60    | 729     | 1.515     | 7.407       | 0,041237113    | 0,10916442       |
|       | 60    | 669     | 1.575     | 8.076       | 0,03960396     | 0,090319968      |
|       | 104   | 609     | 1.679     | 8.685       | 0,066031746    | 0,075408618      |
|       | 102   | 505     | 1.781     | 9.190       | 0,060750447    | 0,058146229      |
|       | 98    | 403     | 1.879     | 9.593       | 0,055025267    | 0,043852013      |
|       | 100   | 305     | 1.979     | 9.898       | 0,053219798    | 0,031794016      |
|       | 77    | 205     | 2.056     | 10.103      | 0,03890854     | 0,020711255      |
|       | 63    | 128     | 2.119     | 10.231      | 0,030642023    | 0,012669504      |
| 300   | 102   | 65      | 2.221     | 10.296      | 0,048135913    | 0,00635324       |
|       | 110   | 263     | 2.331     | 10.559      | 0,04952724     | 0,025543901      |
|       | 80    | 153     | 2.411     | 10.712      | 0,034320034    | 0,014490009      |
|       | 22    | 73      | 2.433     | 10.785      | 0,009124844    | 0,006814787      |
| 700   | 3     | 51      | 2.436     | 10.836      | 0,001233046    | 0,00472879       |
|       | 144   | 748     | 2.580     | 11.584      | 0,0591133      | 0,069029162      |
|       | 146   | 604     | 2.726     | 12.188      | 0,056589147    | 0,052140884      |
|       | 138   | 458     | 2.864     | 12.646      | 0,050623624    | 0,037577946      |
|       | 122   | 320     | 2.986     | 12.966      | 0,042597765    | 0,025304444      |
| 300   | 23    | 198     | 3.009     | 13.164      | 0,007702612    | 0,015270708      |
|       | 110   | 475     | 3.119     | 13.639      | 0,036556996    | 0,036083257      |

**Table 71:**Regression of Hoodie sales change % and Inventory level change

| <i>Regression Statistics</i> |             |  |  |  |  |  |
|------------------------------|-------------|--|--|--|--|--|
| Multiple R                   | 0,954687003 |  |  |  |  |  |
| R Square                     | 0,911427273 |  |  |  |  |  |
| Adjusted R Square            | 0,908474849 |  |  |  |  |  |
| Standart Error               | 0,199047346 |  |  |  |  |  |
| Observations                 | 32          |  |  |  |  |  |

| <i>ANOVA</i> |           |             |           |          |                     |  |
|--------------|-----------|-------------|-----------|----------|---------------------|--|
|              | <i>df</i> | <i>SS</i>   | <i>MS</i> | <i>F</i> | <i>Significance</i> |  |
| Regression   | 1         | 12,23083327 | 12,2308   | 308,705  | 2,4439E-17          |  |
| Residual     | 30        | 1,188595384 | 0,03962   |          |                     |  |
| Total        | 31        | 13,41942865 |           |          |                     |  |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | -0,074736987        | 0,038439918           | -1,9443       | 0,06129        | -0,1532418       | 0,0037678        |
| X1 variable | 1,238252644         | 0,070475414           | 17,57         | 2,4E-17        | 1,09432265       | 1,38218264       |

According to the results in Table 71 there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a relationship between variables ( $R = 0.95$ ). The specificity coefficient  $R^2$  is found to be 0.91, and it can be said that 91% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 1,23 branche in sales

**Table 72:** Results of T-Test on Sales of Forum Hoodie Product

|                        | <i>New sales</i> | <i>Old sales</i> |
|------------------------|------------------|------------------|
| Mean                   | 131,64375        | 94,03125         |
| Variance               | 4744,272863      | 2420,547379      |
| Observation            | 32               | 32               |
| Pearson<br>Correlation | 1                |                  |
| Hypothesized<br>Mean   | 0                |                  |
| df                     | 31               |                  |
| t Stat                 | 10,81161083      |                  |
| P(T<=t) one tail       | 2,40654E-12      |                  |
| t critical one tail    | 1,695518783      |                  |
| P(T<=t) two tail       | 4,81308E-12      |                  |
| t critical two tail    | 2,039513446      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

#### **4.5.5.Short Product**

Inventory level and sales numbers are shown by table 73 for Shoe products for Sanko 's stores. Datas are obtained week by week. Inventory level is measured at the beginning of the week. Sales numbers are the total sales number during that week.

**Table 73:** Forum's Short's Sales and Inventory level

| Order | Sales | Inv.Lvl | Cum.Sales | Cum.Inv.Lvl | Change % sales | Change % Inv lvl |
|-------|-------|---------|-----------|-------------|----------------|------------------|
| 80    | 42    | 96      | 42        | 96          |                |                  |
| 80    | 48    | 54      | 90        | 150         | 1,142857143    | 0,5625           |
|       | 56    | 86      | 146       | 236         | 0,622222222    | 0,573333333      |
| 120   | 59    | 110     | 205       | 346         | 0,404109589    | 0,466101695      |
|       | 46    | 51      | 251       | 397         | 0,224390244    | 0,147398844      |
|       | 46    | 125     | 297       | 522         | 0,183266932    | 0,314861461      |
|       | 46    | 79      | 343       | 601         | 0,154882155    | 0,151340996      |
| 400   | 49    | 66      | 392       | 667         | 0,142857143    | 0,109816972      |
|       | 48    | 17      | 440       | 684         | 0,12244898     | 0,025487256      |
|       | 52    | 369     | 492       | 1.053       | 0,118181818    | 0,539473684      |
|       | 70    | 317     | 562       | 1.370       | 0,142276423    | 0,301044634      |
|       | 50    | 247     | 612       | 1.617       | 0,088967972    | 0,180291971      |
|       | 46    | 197     | 658       | 1.814       | 0,075163399    | 0,12183055       |
|       | 43    | 151     | 701       | 1.965       | 0,065349544    | 0,083241455      |
| 200   | 81    | 108     | 782       | 2.073       | 0,115549215    | 0,054961832      |
| 200   | 71    | 27      | 853       | 2.100       | 0,090792839    | 0,013024602      |
|       | 82    | 156     | 935       | 2.256       | 0,096131301    | 0,074285714      |
| 400   | 70    | 274     | 1.005     | 2.530       | 0,07486631     | 0,121453901      |
|       | 65    | 204     | 1.070     | 2.734       | 0,064676617    | 0,080632411      |
|       | 77    | 539     | 1.147     | 3.273       | 0,071962617    | 0,197147037      |
|       | 81    | 462     | 1.228     | 3.735       | 0,070619006    | 0,141154904      |
|       | 88    | 381     | 1.316     | 4.116       | 0,071661238    | 0,102008032      |
|       | 77    | 293     | 1.393     | 4.409       | 0,058510638    | 0,071185617      |
|       | 74    | 216     | 1.467     | 4.625       | 0,053122757    | 0,048990701      |
|       | 38    | 142     | 1.505     | 4.767       | 0,025903204    | 0,030702703      |
| 400   | 25    | 104     | 1.530     | 4.871       | 0,016611296    | 0,021816656      |
|       | 34    | 79      | 1.564     | 4.950       | 0,022222222    | 0,016218436      |
|       | 80    | 445     | 1.644     | 5.395       | 0,051150895    | 0,08989899       |
| 120   | 81    | 365     | 1.725     | 5.760       | 0,049270073    | 0,067655236      |
| 200   | 72    | 284     | 1.797     | 6.044       | 0,04173913     | 0,049305556      |
|       | 77    | 332     | 1.874     | 6.376       | 0,042849193    | 0,05493051       |
|       | 80    | 455     | 1.954     | 6.831       | 0,042689434    | 0,071361355      |
|       | 74    | 375     | 2.028     | 7.206       | 0,037871034    | 0,054896794      |

**Table 74:**Regression of Short sales change % and Inventory level change

| <i>Regression Statistics</i> |             |  |  |  |  |  |
|------------------------------|-------------|--|--|--|--|--|
| Multiple R                   | 0,954687003 |  |  |  |  |  |
| R Square                     | 0,911427273 |  |  |  |  |  |
| Adjusted R Square            | 0,908474849 |  |  |  |  |  |
| Standart Error               | 0,199047346 |  |  |  |  |  |
| Observations                 | 32          |  |  |  |  |  |

| <i>ANOVA</i> |           |             |           |          |                     |  |
|--------------|-----------|-------------|-----------|----------|---------------------|--|
|              | <i>df</i> | <i>SS</i>   | <i>MS</i> | <i>F</i> | <i>Significance</i> |  |
| Regression   | 1         | 12,23083327 | 12,2308   | 308,705  | 2,4439E-17          |  |
| Residual     | 30        | 1,188595384 | 0,03962   |          |                     |  |
| Total        | 31        | 13,41942865 |           |          |                     |  |

|             | <i>Coefficients</i> | <i>Standart Error</i> | <i>t Stat</i> | <i>P-Value</i> | <i>Lower %95</i> | <i>Upper %95</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept   | -0,074736987        | 0,038439918           | -1,9443       | 0,06129        | -0,1532418       | 0,0037678        |
| X1 variable | 1,238252644         | 0,070475414           | 17,57         | 2,4E-17        | 1,09432265       | 1,38218264       |

According to the results in Table 74 there is a statistically significant relationship between sales and change of inventory level. ( $p < 0.05$ ). There is a relationship between variables ( $R = 0.95$ ). The specificity coefficient  $R^2$  is found to be 0.91, and it can be said that 91% of the changes in sales depend on the change in change of inventory level. According to the result of F statistic in which the general significance of the model is evaluated, the model is found to be generally meaningful ( $p < 0.05$ ). When the table is examined, inventory level variables are statistically significant ( $p < 0.05$ ). When the regression equation is examined, it is seen that the 1-branch changes in the stock will cause a change of 1,23 branche in sales

**Table 75:** Results of T-Test on Sales of Forum Short Product

|                     | <i>New sales</i> | <i>Old sales</i> |
|---------------------|------------------|------------------|
| Mean                | 86,03636364      | 61,4545          |
| Variance            | 578,3336364      | 295,068          |
| Observation         | 33               | 33               |
| Pearson             |                  |                  |
| Correlation         | 1                |                  |
| Hypothesized        |                  |                  |
| Mean                | 0                |                  |
| df                  | 32               |                  |
| t Stat              | 20,55179647      |                  |
| P(T<=t) one tail    | 2,65208E-20      |                  |
| t critical one tail | 1,693888748      |                  |
| P(T<=t) two tail    | 5,30416E-20      |                  |
| t critical two tail | 2,036933343      |                  |

The value is 0,000. H0 hypothesis is rejected if  $0,000 < 0,05$ . And it is decided that there is a meaningful difference between the old sales averages and the new sales averages

As a result of all these analyzes; the following table summarizes whether there is a meaningful difference between the old sales after the stock change and the new sales average:

**Table 76:** T-Test Results for Stores old sales and new sales

| Warehouse Name        | Product Name | Significant Difference | No Significant Difference |
|-----------------------|--------------|------------------------|---------------------------|
| <b>Adana Optimum</b>  | Socks        | ✓                      |                           |
|                       | Shoes        | ✓                      |                           |
|                       | T-shirt      | ✓                      |                           |
|                       | Hoodie       | ✓                      |                           |
|                       | Short        | ✓                      |                           |
| <b>ANK Gordon</b>     | Socks        | ✓                      |                           |
|                       | Shoes        | ✓                      |                           |
|                       | T-shirt      | ✓                      |                           |
|                       | Hoodie       | ✓                      |                           |
|                       | Short        | ✓                      |                           |
| <b>IST Akbati</b>     | Socks        | ✓                      |                           |
|                       | Shoes        | ✓                      |                           |
|                       | T-shirt      | ✓                      |                           |
|                       | Hoodie       | ✓                      |                           |
|                       | Short        | ✓                      |                           |
| <b>Gant Sankopark</b> | Socks        | ✓                      |                           |
|                       | Shoes        | ✓                      |                           |
|                       | T-shirt      | ✓                      |                           |
|                       | Hoodie       | ✓                      |                           |
|                       | Short        | ✓                      |                           |
| <b>IST Forum</b>      | Socks        | ✓                      |                           |
|                       | Shoes        | ✓                      |                           |
|                       | T-shirt      | ✓                      |                           |
|                       | Hoodie       | ✓                      |                           |
|                       | Short        | ✓                      |                           |

Referring to Table 76, it has been determined that there is a meaningful difference between old sales and new sales averages, generally resulting in stock changes.

## CONCLUSION

There are many studies in the literature regarding inventory management, the relationship between stocks and sales, and stocks affecting sales. Alper, et al. (2018), the ABC stock analysis method was applied with the intention that the medical consumables and drug stocks of hospitals could be used effectively. The SMS system has been switched to the continuity of the application. The findings of the research are that SMS system is important for materials that appear stock but not real, and stock analysis and SMS system can prevent negative situations such as loss or leakage which are experienced in stocks. In a study by Dikilitaş and Öztürk (2010), the development of the selling price and amount of wood raw materials was examined through auction sale. As a result, it has been determined that keeping stocks low and determining / decreasing supply according to market demand will be useful in terms of sales. Another study on the subject was carried out by Yüksel and Duran (2017). In this study, drugs are classified by gender using ABC analysis. Survey findings indicate that profitability can be increased if the order quantity is determined at weekly or shorter periods.

In model products are examined very carefully. Products are selected, do not interact with seasonality. To illustrate Seasonality, product that is 'cap' is good example. When sales of cap compare with summer's months and winter's months result can be conspicuous. Despite of the difference of inventory level, sale's number of cap in summer is more than in winter. If stock's conversion rate for sale's of cap is %5 in winter, this ratio go up to %90 in summer. The best explanation of that, people in summer need cap to avoid sunshie. The products are observed are not given react to seasonality so inventory level can be measured to understand whether it is effective or not on sales.

The shops in model also play as important role as product with nonseasonal. Every shop in model is located different places of Turkey. Every shop has also different type of customers. Nowadays in Turkey people's income can be different. People's priority also can be changable according to money they make. People who earn minimum wage of course can not attempt to buy those sports product. Shops in our model are chosen according to conversion rate of shopping mal. Every five stores in model has same conversion rate of sales. For example Adana optimum's conversion rate is %43,77. Ankara Gordion's conversion rate is %44.01. IST Akbatı's conversion rate is %43,69. Gant Sanko park's conversion rate is %44.09. IST Forum's conversion rate is %43,99

The other thing that is taken into consideration is average price of baskets of one



customer. Because conversion rate only show the ratio of how many people enter the stores and how many of them buy something. In shops price can be variable. There are some products can be bought only 9,99 TL also some of them can be bought 1999,99TL. After considering conversion rate, average basket price per customer takes significant role. In this 5 stores average basket price is quite similar. For example Adana optimum's average basket price is 223,55 TL. Ankara Gordion's average basket price is 221,44TL. IST Akbatı's average basket price is 224,11 TL. Gant Sanko park's average basket price is 223,22TL. IST Forum's average price is 222,96 TL. Table 79 shows that every store's average price per customers.

**Table 77:** Average basket price for stores.

| Months | Adana Optimum | Ank Gordion | Ist Akbatı | Gant Sanko park | Ist Forum |
|--------|---------------|-------------|------------|-----------------|-----------|
| 1      | 218,15        | 220,59      | 226,87     | 214,29          | 219,68    |
| 2      | 217,28        | 222,59      | 210,75     | 219,92          | 220,51    |
| 3      | 217,80        | 215,58      | 229,35     | 220,62          | 207,15    |
| 4      | 224,32        | 220,09      | 232,78     | 214,03          | 217,98    |
| 5      | 222,87        | 224,41      | 224,42     | 213,44          | 219,56    |
| 6      | 215,00        | 222,97      | 229,26     | 229,01          | 215,96    |
| 7      | 216,48        | 215,82      | 217,54     | 226,98          | 221,23    |
| 8      | 219,89        | 220,59      | 219,27     | 227,75          | 216,15    |
| 9      | 221,22        | 218,60      | 216,98     | 208,26          | 220,34    |
| 10     | 215,32        | 212,67      | 219,83     | 220,62          | 228,96    |
| 11     | 225,57        | 218,22      | 213,77     | 223,25          | 219,17    |
| 12     | 222,37        | 213,56      | 224,93     | 211,29          | 221,83    |
| 13     | 220,23        | 223,31      | 216,77     | 212,57          | 223,84    |
| 14     | 223,85        | 222,35      | 219,80     | 211,27          | 222,78    |
| 15     | 218,10        | 218,21      | 224,92     | 230,38          | 220,21    |
| 16     | 213,14        | 210,89      | 222,77     | 210,06          | 227,36    |
| 17     | 219,85        | 226,18      | 223,11     | 220,12          | 223,99    |
| 18     | 213,88        | 214,45      | 226,89     | 213,32          | 222,18    |
| 19     | 217,94        | 213,64      | 221,25     | 213,19          | 227,31    |
| 20     | 213,06        | 215,91      | 218,69     | 224,33          | 214,43    |
| 21     | 225,96        | 213,23      | 217,89     | 216,68          | 231,81    |
| 22     | 227,47        | 222,30      | 218,71     | 218,77          | 216,40    |
| 23     | 217,74        | 216,58      | 218,99     | 211,93          | 224,89    |
| 24     | 217,92        | 227,00      | 222,34     | 221,20          | 214,88    |

For Adana store's average price basket's kurtosis is -0,722547019 and skewness is 0,315079694. jB test p value is 0,732952 which is higher than p value. According to Jarque-Bera test we assume data is normally distributed.

For Ank Gordion store's average price basket's kurtosis is -1,0359 and skewness is 0,090474. jB test p value is 0,582376 which is higher than p value. According to Jarque-Bera test we assume data is normally distributed.

For IST Akbatı store's average price basket's kurtosis is -0,057190367 and skewness is 0,191924213. jB test p value is 0,980147 which is higher than p value. According to Jarque-Bera test we assume data is normally distributed.

For Gant Sanko park store's average price basket's kurtosis is -0,95172 and skewness is 0,416058. jB test p value is 0,583077 which is higher than p value. According to Jarque-Bera test we assume data is normally distributed.

For IST Forum store's average price basket's kurtosis is 0,874377786 and skewness is -0,220641648. jB test p value is 0,665904 which is higher than p value. According to Jarque-Bera test we assume data is normally distributed.

Table 80 shows us all stores' average basket price is statistically same. F value is 1,86 and F critical value is 2,4. F value is smaller than Critical value, we can assume those groups have same means.

**Table 78:** ONE WAY ANOVA for average basket prices

Summary

| <i>Groups</i>   | <i>COUNT</i> | <i>SUM</i>  | <i>AVERAGE</i> | <i>VARIANCE</i> |
|-----------------|--------------|-------------|----------------|-----------------|
| Adana Optimum   | 24           | 5265,425086 | 219,3927119    | 16,84837031     |
| Ank Gordion     | 24           | 5249,730356 | 218,7387649    | 20,67226401     |
| Ist Akbatı      | 24           | 5317,866295 | 221,5777623    | 27,10442713     |
| Gant Sanko park | 24           | 5233,287107 | 218,0536295    | 41,82644799     |
| Ist Forum       | 24           | 5298,625929 | 220,7760804    | 28,55692806     |

ANOVA

| <i>Variance</i> | <i>SS</i>   | <i>df</i> | <i>MS</i>   | <i>F</i>    | <i>P-Value</i> | <i>F crit</i> |
|-----------------|-------------|-----------|-------------|-------------|----------------|---------------|
| Between Groups  | 201,9017183 | 4         | 50,47542958 | 1,869343521 | 0,120540237    | 2,450571      |
| Within Groups   | 3105,194062 | 115       | 27,0016875  |             |                |               |
| Total           | 3307,095781 | 119       |             |             |                |               |

According to the results of the research, it is observed that there is a statistically significant difference between the old sales average and the new sales average in general. Our analyzes show that there is a high correlation between sales and stocks, and this relationship is generally positive. According to our regression analysis results, one unit increase in inventory level is found to create an effect in increasing sales. Accordingly, quantity of in-store inventories affect sales, positively. As an alternative to the strategies applied to increase sales in this context, it may be shown as a viable option to change the inventory level increase.

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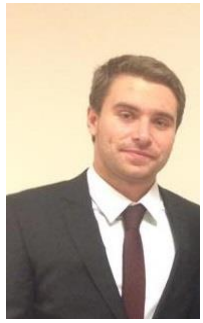
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Academic qualifications

Işık University Business Administration and Management, General (2016-2018)

Işık University Industrial Engineering (İstanbul) (2009-2015)

Borsa Anadolu Highschool (Çorlu/Tekirdağ) (2005-2009)

**EXPERIENCE (December 2018- Now)**

- Responsible for coordination and planning requirements of the category, and manage purchasing budget.
- Demand planning- forecasting sales for the coming months
- Supply planning- finalizing the supply planning and ordering of stock.
- Responsible for monitoring sales, warehouse stocks, traffic of the category; creating new action plans when necessary.
- Analyze SKU (Stock Keep Unit) performance daily/weekly to optimize & sales
- Minimize end of season stock; decrease replenishment on slow selling items, to increase the sell-through and minimize stock cost
- Responsible for all processes from the arrival of the products to the end of the sales cycle; and be able to analyze & improve these processes.
- Responsible for new campaign banners and product groups that need to be highlighted, creating new campaigns and discounts for products.
- Monitoring and working together with the visual team for the sample processes of photographing.
- Regularly conducting brand / competitor / product analysis, taking action for new trends in the industry.
- Be in communication and coordination with necessary departments (category, sourcing, logistics).

**Intersport as Category Supervisor ( June 2018-December 2018)**

- Developing and implementing the strategy of the category in line with market needs and trends
- The implementation of the new product range- selection of the products and pricing.
- Continuous analysis of the performance of current range and taking the right action plans required
- Handling all supplier relations
- Carrying out daily stock and sales analysis, monitoring and analyzing best sellers • Prepare and adjust weekly reports

- *preparing seasonal sales budget for the related product group on category basis and taking responsibility of gross profit target*
- *Analyzes and reports promotional activity effect on sales quantity, value and margin results versus budget.*
- *follows up actual sales and margin result versus budget*
- *Forecasting future sales and deciding on the amount of products order unit based on current stock sales data*
- *Improves seasonal buying budget process and creates new planning tools to support budget process*

*Decathlon as Retail Supplier (August.2016- june 2018)*

*Demand and supply planning and forecasting, Ensuring a solid stock availability rate in warehouse & store.*

*Selecting the "product range" to be sold in Turkey following trends and market structure.*

*Execution of country stock monitoring/domestic (re-)allocation of stocks Stock level and stock lifetime, margin and T/O forecast analysis through the use of SAP.*

*Managing the pricing, stock monitoring, product identity modification, product order flow and availability on a daily basis through SAP*

*Communicating with domestic producers and international suppliers.*

*Preparing weekly/-monthly-yearly reports in coordination with commercial team to boost sales in stores.*

*Industrial Enginner at Yünsa(october 2015-june.2016)*

- *Planning, implementation and reporting of production related Production System (Lean Manufacturing) tools,*
- *Conducting time measure of production working phases and sub-phases,*
- *Conducting time data acquisition and organization in a structured database,Analysing gaps between theoretical data and manufacturing current data and investigating the causes,*
- *Analysing manufacturing execution methods to increase efficiency and optimize operator workload,To do ergonomoy analysis of operations and improve the situation,*
- *Analysing production flow and supporting Lean Manufacturing projects.*

*Internship 2 - C.F.Maier Polimer Tek.Ltd.Şti. (Production Department) (Automotive Supply Industry) July 2013 Internship 1 - Yünsa Yünlü San. ve Tic. A.Ş. (Planning Department) july 2012*

*Computer skills*

- *SAP,C++ software known,Knowledge of MS Office tools including MS project, PowerPoint.Minitap*

*CERTIFICATE:*

- *İSTANBUL İNSTUTE:PROJECT MANAGEMENT(60 HOURS)*

*Project Management, Project Integration Management, Project Integration Management, Project scope Managment, Project time Managment, Project cost Managment, Project quality Managment, Proect communications Managment, Project risk Managment, Project stakeholder*

- *6SİGMA CENTER:GREENBELT(72 HOURS)*

*Lean Production, Lean Production Principles, 7 Fundamental Items of Waste, Lean Production Tools (Lean House) Strategic management (Vision, Mission), Goals, Policies, Corporate Culture, Standardization (5S, Process Management) ,JIT (VSM, KANBAN, SMED), JIDOKA (Poka Yoke, KAIZEN, TPM), Diversity and Sources of Diversity, Definition Phase and Used Techniques, Measurement Phase and Used Techniques, Analysis Phase and Used Techniques, Improvement Phase and Used Techniques, Control Phase and Used Techniques*

*FOREIGN LANGUAGE :*

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