

**INVENTORY MANAGEMENT AND PROFITABILITY:  
TURKISH IT DISTRIBUTORS LISTED IN BORSA ISTANBUL**

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**IŐIK UNIVERSITY  
JANUARY, 2022**

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Işık University, School of Graduate Studies, Executive MBA Master Program,  
2022

This thesis is submitted to Işık University School of Graduate Studies as Master  
Degree(MA)

IŞIK UNIVERSITY  
JANUARY, 2022

IŞIK UNIVERSITY  
SCHOOL OF GRADUATE STUDIES  
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# **INVENTORY MANAGEMENT AND PROFITABILITY: TURKISH IT DISTRIBUTORS LISTED IN BORSA ISTANBUL**

## **ABSTRACT**

One of the main factors in determining the company's success is its management of scarce capital and business strategies. In today competitive environment, businesses must have sufficient working capital in order to ensure their survival. Inventory is one of the key factor in the working capital management. Inventory management effects on the profitability investigated with correlation and regression analysis conducted via balance sheets and income statements of firms using only four Turkish Information Technologies distributors which listed on Istanbul Stock Exchange XBLSM Index (Borsa Istanbul (BIST)) over a period of 10 years from 2010-2020. Profitability measured by Change in Gross Profit Margin and inventory management measured by Change in Inventory Turnover Dates, Change in Account Receivables Turnover Days, Change in Sales and Change in Stocks. Quarterly financial reports used for the research. The data for the analysis is collected from the Public Disclosure Platform (PDP) database, which contains financial information on all stock exchange firms. While correlation analysis shows statistically meaningful relationship, regression analysis did not show any statistically meaningful relationship between the inventory management and the profitability in the study.

**Key words:** profitability, inventory management, working capital, Inventory turnover ratio

# STOK YÖNETİMİ VE KARLILIK: BORSA İSTANBUL'DA LİSTELENEN BİLİŞİM SEKTÖRÜ DİSTRİBÜTÖRLERİ

## ÖZET

Bir şirketin başarısını belirleyen ana faktörlerden biri, kısıtlı sermayesini yönetimi ve iş stratejileridir. Günümüzün zorlu rekabet ortamında işletmelerin hayatta kalabilmeleri için yeterli işletme sermayesine sahip olmaları gerekmektedir. Stoklar işletme sermayesi yönetiminde en önemli faktörlerden biridir. Bu çalışmada Borsa İstanbul XBLSM Bilişim endeksinde işlem gören 4 Bilişim ve Teknoloji Distribütörü firmanın 2010-2020 yılları arasındaki 10 yıllık periyodu için bilanço ve gelir tabloları kullanılarak korelasyon ve regresyon analizi ile stok yönetiminin karlılık üzerindeki etkisi incelenmiştir. Çalışmada Karlılık, Brüt Kar Marjındaki değişim ile Stok Yönetimi ise Stok Devir Hızı değişimi, Alacak Devir Hızı değişimi, Satışlardaki değişim ve Stoklardaki değişim ile ölçülmüştür. Araştırmada çeyreklik veriler kullanılmıştır. Analiz için veriler, borsada işlem gören şirketlere ilişkin finansal bilgileri içeren Kamuoyu Aydınlatma Platformu (KAP) veri tabanından toplanmıştır. Korelasyon analizi istatistiksel olarak anlamlı bir ilişki gösterirken, regresyon analizi çalışmada stok yönetimi ile karlılık arasında istatistiksel olarak anlamlı bir ilişki göstermemiştir.

**Anahtar Kelimeler:** karlılık, stok yönetimi, çalışma sermayesi, stok devir hızı

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## **LIST OF ABBREVIATIONS**

- BIST : Borsa Istanbul / Istanbul Stock Exchange  
CARTD : Change in Account Receivables Turnover Days  
CITD : Change in Inventory Turnover Days  
CPGM : Change in Gross Profit Margin  
CS : Change in Sales  
CI: Change in Inventory  
FIFO : First-in, First-Out  
IT : Information Technologies  
ITP : Inventory Turnover Period  
JIT : Just in Time  
PDP : Public Disclosure Platform  
SME: Small and Medium-Sized Enterprise  
WCM: Working Capital Management

## **INTRODUCTION**

Companies' main goal is making profit from their businesses. In competitive business life it is very crucial to keep the business profitable. In order to make sustainable profit, companies must manage their working capitals efficiently. One of the most important capital for the company is the inventory. Because of this companies must keep the right amount of inventory in right time and at the right place with the optimum costs. Products on hand in company in order to sell or using in production activities are called as "stocks" or "inventory". Inventories are all the assets that keep on hand for to sales activity or production purposes and can turn into cash at any time. Inventories play a vital role in guaranteeing the continuity of business operations, adapting business operations against demand fluctuations, and sustaining business operations in the face of problems with contractors and pricing changes. Inventories are kept in this situation largely for the purpose of conducting commercial activity and satisfying an undetermined demand. Turkish IT distributors must have stock in order to meet with the demands from the retailers. However excessive storage of inventories is not desired because it may increase the cost of holding inventory such as insurance, storage costs and most importantly tied working capital create extra financial costs to company. Insufficient inventory, on the other hand, might result in a loss of revenue, loss of customers, and market share. As a result, a good inventory management system must be developed to ensure that the firms always have the right amount of assets on hand. Within the same organization, various departments have different attitudes regarding the inventory. For example, the sales department could want to keep a big amount of inventory on hand to accommodate nearly any demand. Similarly, the manufacturing department would request similarly a high level of inventory to ensure the manufacturing processes functions smoothly. On the other hand, finance department, would constantly want for a minimum stock investment so that the funds could be put to better use elsewhere. (Augustine, A.N., and Agu, O. 2013).

The basic purpose of inventory management is to establish and maintain the optimal level of inventory. This will create a positive relationship between customer satisfaction and effective inventory management. Inventory is a significant part of the working capital. The success or failure of a business is largely determined by its inventory management capabilities. Inventory management and the control not only solves the liquidity problem, but also increases profitability. Inventory relates to production and sales activities. Inventory is an idle asset with a holding cost, it is desirable that investment in inventory assets preferable to spend as little as possible in inventory assets. (Panigrahi, 2013).

Companies want to manage their inventories well because inventory has a lot of costs and because of this reason firms must serve a good inventory management system in order to survive and be successful in the competitive market.

To understand the relationship between inventory and the profitability of firms this research will be focuses on 4 different Turkish IT distributors which their company's shares are traded in Borsa Istanbul Stock Exchange XBLSM Index. These companies are Indeks Bilgisayar, Armada Bilgisayar and Arena Bilgisayar Sanayi Ve Ticaret A.S. and Datagate Bilgisayar. The data for the analysis will be gathered from their quarterly financial statements from Public Disclosure Platform (PDP) between 2010 to 2020.

## **CHAPTER 1**

### **1. OVERVIEW OF INVENTORY MANAGEMENT**

#### **1.1 Inventory Definition**

Companies and investors both want their businesses to be lucrative and sustainable. Due to the competitive marketplace, currently it is very crucial for businesses to increase profits. For most businesses inventory management is getting more critical, as inventory is one of the costliest items on their balance sheets. Although the inventory is a costly line in the balance sheet companies must maintain inventory while considering fluctuations in customer demands and the uncertainty of lead times. Companies must execute these processes quickly and with minimal expenses while keeping inventory to meet with the customer's demand. Otherwise, companies have a risk of losing customers, sales and profits due to lack of inventory.

Almost every firm in the world must keep inventory & stock in order to keep their service quality and customer retention high. In this study mainly distributors will be investigated, and distributors only sell finished products. Because of this the data and analysis will only cover finished products.

Inventories are the amounts of finished items, raw materials, and intermediate goods that a company has on hand at any given moment to fulfill unexpected needs and keep production running smoothly (Seyidođlu, 1992, p.794-795). For Kobu, inventory includes all goods that are involved in the manufacturing process. A different definition considers all stored value as a stock. (Kobu, 2008, p. 327). Businesses should keep enough stock on hand to fulfill orders while minimizing inventory holding costs.

Inventory is retained for the purpose of protecting the company from unknown market demand fluctuations. The amount of inventory held by a corporation has an impact on service quality and inventory expenses. The service level is a percentage that represents how much of demand is met directly by stock. When a corporation has a lot of inventory, the service level is usually high in the context of meeting with the demand. Increased inventory, on the other hand, results an increase in inventory-related expenditures such as the cost of keeping the inventory, the cost of obsolescence, and the opportunity cost of investing in goods that isn't being used. When less inventory is on hand, these expenses drop, but the degree of customer service drops as well (Ratanachote, 2011). So, there is a very thin line between the holding stock and not holding stock.

Businesses who maintain their inventory at the correct time, in the right amount, and in the appropriate location can reduce their costs and they are one step ahead of their competitors by delivering the best service to the customer as soon as possible within the meeting the demand.

## **1.2 Inventory Types**

Inventory primarily consists of raw materials, semi-finished goods, finished products, and spare materials, as defined in the definition of inventory.

### **1.2.1. Finished Products**

Finished products mean that a product can be sold without the need of any other production operation. Distributors only sell finished products or spare parts; they did not produce or assemble products in their facilities because of their contract and the objective of their businesses.

### **1.2.2. Raw Materials**

All goods purchased by an organization for processing into production are considered raw materials. Unprocessed products are raw materials and companies use these products to turn into a finished product and sell it to costumers.

### **1.2.3. Semi-finished Goods**

Semi-finished goods are temporarily stockpiled until they are reused in production processes. They are assets that have not yet been completed and have been accumulated in intermediate warehouses between workstations. After a while, their semi-finished properties turn into finished products after all processes are completed. The purpose of holding inventory of semi-finished products is to prevent a disruption in one activity during the production phase from affecting another activity.

### **1.2.4. Spare & Auxiliary Materials**

Spare parts are the products that kept in inventory for a replacement or repairing the broken products. These products are not used in production directly.

## **1.3 Cost of Holding Inventory**

Stocks are thought to be required primarily for two reasons, with the remaining reasons being considered derivatives of these two. The two key reasons for maintaining stock were the unpredictability of demand and the uncertainty of demand. The requirement to holding inventory will be avoided if the timing and quantity of needs can be accurately forecasted. Inventory refers to the monetary value of physical assets that are directly or indirectly incorporated in manufactured goods in the production chain and are kept for future use or with the aim of being sold. (Sekeroglu, 2014). Inventories play a crucial role in guaranteeing the continuation of organizations' operations, adapting company activities against to demand fluctuations, and sustaining corporate operations. Keeping inventory means tied up precious money to stock. Companies mostly keep stock for below reasons,

- To be a predictable,
- To meet with the fluctuations of demand,
- Protection for price changes,
- If the order quantity is high, advantaging of discounts,

Keeping inventory generates costs to firms. These are generally categorized into three types as holding inventory costs, ordering costs, and not holding inventory costs.

### **1.3.1. Inventory Holding Costs**

The cost of temporarily storing an item until it is sold is known as inventory holding cost. (Shenoy and Rosas, 2018). It is characterized as the costs change based on the inventory amount; they rise as the inventory amount rises and fall as the inventory quantity decrease (Aksoy and Yalciner, 2005). Price changes, financial costs, holding stock in warehouse cost, insurance and other fixed costs in warehouse are all the costs of inventory. Excessive inventory storage can result an increase in costs such as storage and insurance, while insufficient inventory can result in production disruptions, customer loss, and a reduction in market share.

### **1.3.2. Ordering Costs**

Purchasing cost of raw materials, semi-finished products or finished products are all related with the ordering costs. (Erdogan, 2020). All expenses such as loading, unloading, transportation, insurance, customs taxes, and duties are in order costs. These are the costs associated with each new order, such as preparing new order request forms, internal communication for notifying and receiving approval from appropriate departments, conducting market research on vendors, vendor communication costs, and checking incoming products. While some of these costs are fixed, such as the pay of supply department staff and the department's electricity bills, they are typically the expenditures that rise in direct proportion to the number of orders (Kobu, 2008, p. 327).

### **1.3.3. The Cost of not Holding Inventory**

This cost comes when there is a demand for a product but there is no inventory for meeting that demand. For example, for a retail shop when a customer asks a specific product that is not available in stock at that moment means losing that possible sale and moreover losing this sale to the competitor if they have in stock for that product. Another example from a manufacturing site, if a raw material is missing which is used in production, then whole production goes under a risk of stop. These two examples may cause a lot to the companies. Profits that cannot be obtained because of customer demands that cannot be met due to production disruption or insufficient stock during the orders received, and most importantly, costs such as loss of customer and reputation that must be endured. In order to avoid these costs and not to lose sales,



businesses need to evaluate their current stock situation in the best way. (Erdogan, 2020)

**Table 1.1:** Advantages and disadvantages of keeping and not holding inventory

	<b>Holding Inventory</b>	<b>Not Holding Inventory</b>
<b>Advantages</b>	Protection for fluctuations in demand	No cost of holding costs
	Protection for fluctuations in lead time	No money tied to stocks
	Protection for price changes	
	Advantaging of discounts	
	Meeting customers' demands	
<b>Disadvantages</b>	Money tied to stocks	Loss of possible sales
		Loss of customer service level
	Costs of holding inventory	
	Opportunity cost of money tied to stocks	

#### **1.4 Inventory Management**

In a competitive market, companies must excel on managing their inventory and plan their operations effectively. The amount of inventory held by a company has an impact on the quality and the cost of the service. Inventory is retained to protect the company from market demand fluctuations. The service level is a percentage that indicates how much demand is directly met by inventory. When a corporation has a lot of appropriate inventory, the service level is usually high but at the same time the costs of the keeping high amount of inventory increase the company costs. Managers must find the optimum level of the inventory while keeping service level high and minimizing the cost. Inventory management is a system that ensures that the needed inventory is available at all times, allowing production or sales to continue uninterrupted. (Panigrahi, 2013). Another definition for the inventory management is that it covers planning, organizing, controlling, and directing all supply chain operations. Inventory management involves ensuring that all product inputs available to the company and keep continue to operate at a level that will not interrupt production or sales and ensuring operating costs are maintained at a low level without affecting operating efficiency (Mwangi, 2016). Problems that may arise during the production phase are one of the main reasons for the emergence of stocks. The greater the uncertainty of

these disruptions, the more stock will be required. Even if the future demands are known clearly, there is no guarantee that the factors in all stages of the production systems will always work with the same efficiency. For this reason, the unpredictability of the demands and possible disruptions in production necessitate the need to keep stock.

When companies hold inventory, they are trying to meet with these conditions; holding inventory in order to meet with the demand, lowering the money tied up to stocks, with available inventory meeting the customer retention and high service level and of course increasing the company profitability. Inadequate stock has an adverse effect on the business operations but on the other hand excess inventory creates extra costs and it can lower the profits due the high costs. Excessive inventory is not desirable for longer periods because carrying cost and precious money tied up to stocks. Keeping inventory longer for products with an expiration date is also a risk for the companies.

All of these conditions shows that inventory management is very important for a company. Consequently, effective inventory management systems will ensure that the companies always have the optimal inventory levels and according to this profit of the company may increase due to high level of service level and the increase in the sales regarding meeting with various the demand.

Managers must find the thin line between excessive inventory and the scarce inventory. Having a large inventory on hand decreases ordering costs and protects against price volatility, production process disruptions, and commercial loss due to product shortage. (Nguyen and Nguyễn ,2018).

Granting trade credit, on the other hand, has a number of advantages for the company's sales. An increase in the firm's inventory turnover rate generally means that inventories are more effectively managed and considered as an indicator of a good management. Increased inventory turnover rate may cause the firm to earn more profits it also reduces the need for financing. In other words, an enterprise with an increased inventory turnover will have the opportunity to bind relatively less money to their inventories. A firm with a high inventory turnover rate generally has more effective competition. Moreover, a firm can expand its sales volume by reducing its profit margin. The expansion of the sales volume may increase the profit of the company

despite the decrease in the profit margin. On the other hand, the high inventory turnover rate may not always be interpreted in favor of the business. For example, if the stocks of the enterprise are insufficient compared to the business volume, or if the stocks cannot be renewed due to supply or production difficulties, some negativities may be encountered despite the high inventory turnover rate (Erokyar, 2008).

Increased inventory, on the other hand, leads the high inventory-related expenditures such as the cost of holding the inventory, the cost of obsolescence, and the opportunity cost of money that put into the stocks that are waiting to be sold for a long time. When less inventory is held, these expenses drop, but the degree of service drops as well (Ratanachote, 2009). Inventory management is significant for maintaining a smooth operation and helps company to profit and sales. This demonstrates how inventory management allows for operational flexibility. As a result, in order to ensure operational efficiency and effectiveness, distributors and wholesalers are expected to maintain optimum levels of inventory in stores. (Augustine, A.N., and Agu, O. ,2013).

In this study inventory management will be studied mainly focused on the point of view of Information Technologies Distributors. IT Distributors hold inventory with only finished materials and spare parts they don't have a production process, so they don't need to keep raw materials. Wholesalers keep ten to thirty percent extra goods that isn't essential, according to Mensah, Morrison and Ackah (2017). According to their study, this resulted in unnecessary carrying cost, a lower volume of sales, and a lower profit volume because of careless and inefficient inventory management (Mensah et al. ,2017).

## 1.5 Inventory Management System

One of the main objectives is to keep an optimum level of inventory to meet with the demand while keeping it with minimum cost in inventory management system. Managers must excel on this system and decide when to order, how much to order and how much stock should be kept in warehouse in order to maintain an optimum stock level. Moreover, in order to decide to place a new order, first managers must know exact on hand inventory levels. There are some methods that are companies using to control their inventories. Those are visual control method, double box method and computerized control. Excessive inventory storage can result in costs such as storage and insurance, while insufficient inventory can result in production disruptions, customer loss, and a reduction in market share. To minimize all of these disadvantages and determine the ideal inventory level, companies use inventory ordering systems in order to manage effectively their inventory management systems. These are the fixed – order quantity system, the fixed-order interval system, ABC inventory analysis, Economic Order Quantity and Just in Time systems.

**a-) The Fixed-Order Quantity System:** This system basically automatically orders products or pop-up warning messages to the management when the stock level drops at certain points. In this system the ordering time may vary but the order quantity is fixed. In this system the reorder point must be determined.

**b-) The Fixed-Order Interval System:** System checks the level of the stocks at specific times and brings the stock level at desired point. This system maintains the inventory at desired point.

**c-) The ABC Inventory Analysis:** Controlling of inventory, planning of production, quality control, sales, and distribution may all benefit from the ABC method. ABC analysis is a form of inventory classification that divides stock into several categories. (Bahcivanoglu, 2019). There are some products in inventory that have little quantities yet have excessive monetary prices. They often account for 10-20% of all products retained in inventory, while they account up to 70%-80% of the overall monetary value of inventory investment. This is the A category products. There are also things that account for 30-40% of total inventory items while simultaneously accounting for 15-20% overall value of inventory investment. For this group categorized as B. Group C

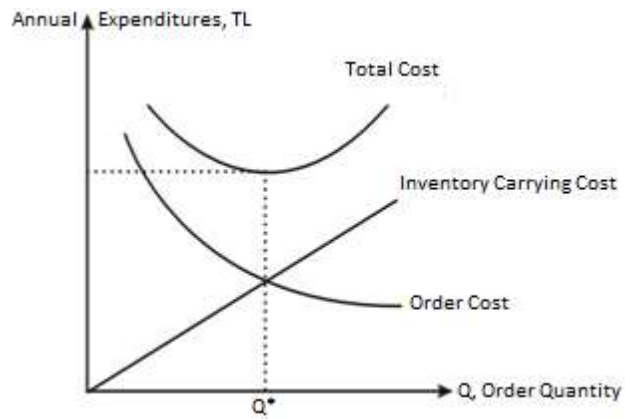
are the things that are normally more numerous yet represent the smallest percentage of the overall inventory investment in terms of monetary worth. The purpose of the ABC inventory categorization system is to be able to inspect the condition of every item in inventory and identify what sort of special care each group of inventory requires. (Augustine, A.N., and Agu, O. ,2013).

**Table 1.2:** ABC Method Classification of Stock Parts

<b>Stock Code</b>	<b>Unit Cost</b>	<b>Monthly Sales (Unit)</b>	<b>TL Amount</b>	<b>Percent TL Amount</b>	<b>of Percentage of staged</b>	<b>Class</b>
<b>Y</b>	750	500	375000	74%	19%	A
<b>P</b>	625	300	187500			
<b>X</b>	100	600	60000	17%	34%	B
<b>W</b>	250	150	37500			
<b>S</b>	50	700	35000			
<b>I</b>	40	600	24000	9%	47%	C
<b>K</b>	50	400	20000			
<b>R</b>	20	1000	20000			

### 1.5.1. Economic Order Quantity

The economic order quantity is used to determine the best level of inventory to keep while keeping the overall cost of ordering and carrying to a minimum. This model is based on the premise that demand is equal to the company's annual total amount ordered at any given time. (Mwangi, 2016)



**Figure 1.1:** Economic Order Quantity

When the amount of inventory on hand increases, carrying of inventory cost also increases. On the other hand, the amount of an order increases, the cost of ordering decrease. In Figure 1, the total cost is calculated by adding these two costs. Total cost first exhibits a downward trend, then begins to rise after a certain point. The point where inventory carrying costs meet with lowering order costs corresponds to the least total cost decrease. As indicated in the diagram, this point ( $Q^*$ ) represents the economic order amount and minimum inventory costs (Sekeroglu, 2014).

### **1.5.2. Just in Time Model**

JIT model is a business strategy for enhancing a company's financial performance by decreasing excess stock and related costs (Shin, Ennis and Spurlin, 2015). The just in time approach is founded on three key principles: waste elimination, continual product and service quality improvement, and employee participation in the development and implementation of the company's initiatives. JIT refers to having the correct items, in the right quantity, at the right time and at the right location. Just in time has the ability to improve production quality, increase productivity, improve production efficiency, and finally reduce waste and other unnecessary costs associated with manufacturing if properly applied. JIT allows a company's inventory levels to be reduced. As a result, businesses reduce their inventory investments and as a result, inventory storage costs are significantly decreased (Mwangi, 2016).

### **1.6 Inventory Control Methods**

In today's competitive and global world most of the enterprises keep a lot of inventory and varying amounts. Keeping track of all of them is extremely tough and time-consuming. To put it another way, identifying the location of a product in a large amount of inventory in the warehouse, having it available to use when needed, and doing so cost-effectively is difficult. Same situation applies for the distributors and the wholesalers. To the complexity, basic control approaches and computer-based solution approaches are used. The size of the company, the method of production, and the number of inventory items all impact the control systems used.

In order to understand the exact inventory level on hand, companies must perform some techniques such as.

#### **1.6.1. Visual control method**

Visual control method is the manual control system. An officer at the warehouse looks into the products stock levels, and they decide whether or not placing an order. Mostly small sized companies use this method. This is the cheapest method of controlling the inventory.

#### **1.6.2. Double box method**

Double box method is the method of keeping same type of stock in two different boxes. When the first box is fully empty orders are met from the second box and a new order is placed for fulfilling the first empty box. If the lead time is constant this method can be useful for mid-size companies.

#### **1.6.3. Computerized control method**

Computerized control method is the most reliable and the easiest way to keep inventory under control. On every product there is a barcode printed and the inventory entries are made with those unique barcodes. In this way all product movement can be tracked easily. With the computerized control method inventory levels can be tracked momentarily.

**Table 1.3:** Advantages and Disadvantages of Inventory Control Methods

<b>Inventory Methods</b>	<b>Control</b>	<b>Advantages</b>	<b>Disadvantages</b>	<b>Usage Areas</b>
Visual control method		Cheapest and easiest system	Well trained worker not compatible for big companies	Small firms
Double box method		Low cost, easy track of stock,if tracking is good efficient stock control method	Very good tracking needed, lead time must not change, demand is fluctuated	Small and medium size firms
Computerized method	control	Reliable, easy, fast and instant information	Costly, every product must be recorded into the system	All kinds of enterprises

### **1.7 Importance of Inventory Management**

Firms must maintain an optimal quantity of inventory on hand in order to satisfy client demand or orders. If a company does not have a requested product in inventory, then customers may purchase product from the competitor firm. While high amount of inventory is risky for company also keeping low amount of stock is not desired for the company.

Companies tied some of their precious moneys to inventories. And some of these products sold with cash in advance and some of them sold on account. Briefly money turns into stock and stock turns into money in this process. Lowering the time of this cycle time will increase the profitability because the money can be used more in the given time frame.

Companies who keep the right amount of inventory in the right time, at the right place and at the right amount is one step ahead regarding the competitors. Because they can serve the customer with lowest possible time. This shows the importance of stock management for businesses. With inventory management, it is aimed to take inventory investment decisions in the most appropriate way by considering the costs of holding or not holding inventory for businesses. The costs of not holding stock are the costs incurred in the case of insufficient stocks may result in a decrease in production and sales (Ilgun, Kokten and Ozbay, 2017). Inventory management is in



direct relationship with profitability. Because it has a financial effect on the balance sheets, and it has directly affected firm's sales, production, and service levels to their customer. The primary goal of most businesses is to make money. Even in a small sole proprietorship firm, the goal is to make profit and increase the owner's wealth. Shareholders of large capital companies also expect companies to make profits and increase the value of their investments when investing in companies. The notion of profit is the most crucial resource that allows a company to continue operating. Businesses, of course, want to generate profit in order to maintain their existence and provide profit to their owners. For this, while businesses want to keep their costs at a minimum, they also want to maximize their sales prices and look for ways to achieve this. Basically, profit is the revenue that come up after subtracting the costs. So, the lower the costs the better the profits.

Various departments in the company may have different views about the inventory. Because every departments motivation is different than the others. For example, the sales department could want to keep a big variety and amount of inventory on hand to accommodate nearly any demand. Similarly, the manufacturing department would request similarly high level of inventory to guarantee that the manufacturing system functions smoothly. Finance department, on the other hand, would always want to invest the bare minimum in stocks so that the money may be put to greater use elsewhere (Augustine, A.N., and Agu, O. ,2013).

One of the main and the most important area for the success of a company is inventory management is. According to one study, inventory often represents almost 40% of total capital of a company (Moore, Lee and Taylor, 2003:321). According to another study inventory holds 33% of company assets and almost 90% of working capital (Sawaya Jr. and Giauque, 2006:121). Less inventory keeping time results less finance needs for this transaction (Kara, 2014). The stock represents a major decision variable, not only for a substantial part of the overall current assets of many organizations, at every stage of manufacture, distribution, and sales. After all, since the inventory is handling a big portion in the company's balance sheet it is very important and crucial that good inventory management is very important for companies. Managers can take advantage of effective and efficient inventory management strategies.

## **1.8 Distributors**

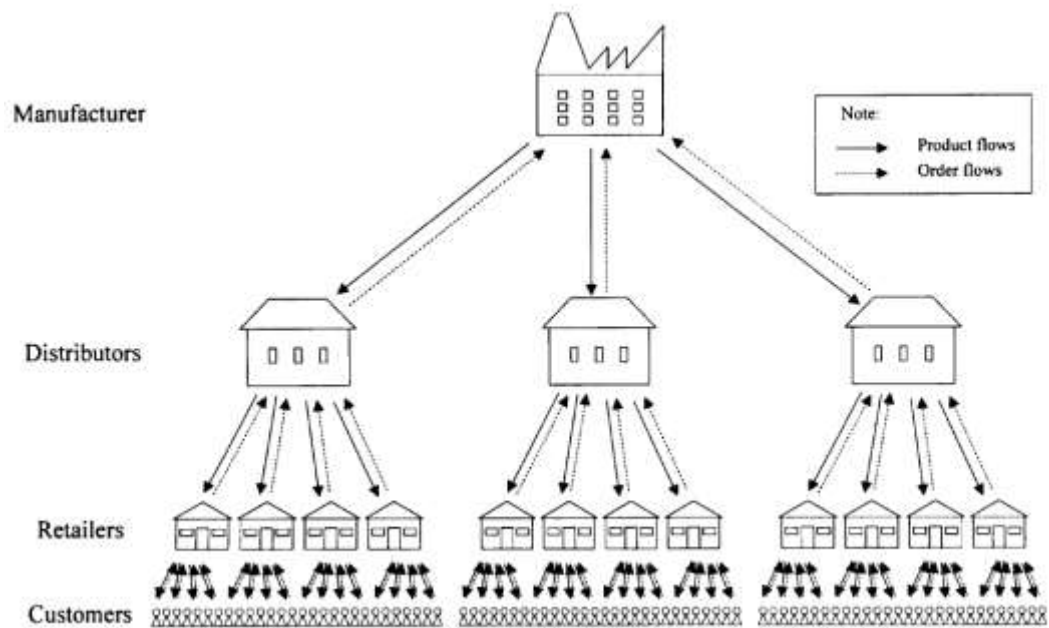
With a contract, the person or institution that buys all or part of the manufacturer's products to sell in a certain region and undertakes the obligation to increase the availability of these goods by selling the contracted goods on his own behalf and account is called the distributor, and the contract made for the execution of these activities is called the distributorship contract. The distributor purchases the manufacturer's goods then markets and sells them himself. The distributor is not the end user. And the distributors cannot sell product directly to end users, distributors only sell products to their resellers (Kayseriliođlu, 2004).

As an independent merchant, the distributor acts on its own behalf and account (Oznalbant, 2009). What distinguishes a distributor from a normal wholesaler is the monopoly rights provided to him (Özcan, 2008).

### **1.8.1. Turkish Information Technologies Distributors**

An IT Distributor is operating as intermediary between manufacturer and resellers. IT Distributors handle the procurement and payment between the reseller and the supplier. Most of the time the only method to sell products to customers for vendors is using distributors in IT sector.

In this study main focus will be the Turkish IT Distributors and their financial statements will be investigated, and in Figure 1.2 showing the basics of the dynamics of this network. Manufacturer or the producer of the product sell products to the distributors and distributors then sell these products to the resellers or retailers. After those resellers sell those products to the end customers. In this figure there is one manufacturer can be seen but normally distributors mostly work with more than one manufacturer. It is same for the manufacturer side; manufacturer can decide to how many distributors will work with them under a contract.



**Figure 1.2:** The distribution networks

Source: Ratanachote, (2011) Distribution Network Dynamics with Correlated Demands

Distributors usually have two types of sales businesses and it's called as Volume Business and Value Business.

- Volume Business:** This type of sales activities usually comes directly from the inventory. Also, it is called as Run-Rate business. This is mostly the daily sales covered from the inventory and it's the main area that creates the inventory load. Usually, when a distributor purchased a product from the manufacturer for their inventory the purchase price having a given standard discounts from the list prices. So that means that for most of the brands or manufacturers do not give extra discount to high number of volume & inventory orders because they have already fixed their prices. So, distributors do not have the chance of decrease their purchasing prices while ordering high amount of product, but they may only decrease their orders costs. But on the other hand, distributors while selling those products they sell to resellers with a lower price than the purchase price. Most manufacturer established promo & recommended sale prices monthly and distributors add their margins to these prices. But still these prices are less than the purchase price. So, at first it can be seen as a sale for loss. But when the sale completed distributors claimed the amount of this

difference from the manufacturer and cover their loss. For example: Purchase price is \$100 and the monthly promo sale price \$80. Distributor add their margin based on the promo price \$80 and in this case it's 5% profit margin. So, the sale price makes \$84. Purchase price – Promo price will give the claim amount.  $\$100 - \$80 = \$20$  and the Sales Price- Cost of goods sold will give us the profit of this transaction. In this case we have  $\$84 - \$100 = - \$16$  loss at first but with  $\$20 - \$16 = \$4$  the (claim amount-profit or loss of the sales) we will have \$4 profit with this transaction. This claim process can be change based on the firms or the manufacturers but most of the brands in Turkish IT Distributors are having similar claiming process.

- **Value Business:** These types of sales activities are made as a project based. Project price means that there is a special price given for a specified partner and the end user. These prices are special for the given project details and can't be used for other projects. Value business sales transactions usually much higher than the Volume business. These transactions sales prices are tailer made to all projects and the end users. A special discount offer given for a specified partner and the end user for a given time period. With this higher discount amounts costs will be much advantageable then the volume business. The difference between the value business and the volume business is value business prices are given only for a specified projects such as reseller and the end user on the other hand for volume business promo prices are open to every reseller for the distributor. In value business the discount amount from the list price is much higher than the volume business and this creates cheaper prices for high amount of project deals.

In table 1.4 Top 10 Turkish Biggest 500 Information Technologies listed according to their sales revenues. The main focus on this study is the Turkish IT Distributors and from the table distributor companies are as follow; Indeks, Arena, Bilkom, Penta, Armada. Other companies are classified in different segments. In this study only four distributor company Indeks, Arena, Armada and the Datagate will be studied. Other distributor companies excluded from the study because of; Bilkom is not listed in the BIST and the Penta has just listed on the BIST in 2020. The necessary financial tables cannot be founded on the PDP system for those two companies, so they must be excluded from the analysis.

**Table 1.4:** List of Top 10 Companies of Bilişim 500 Based on the Sales Revenue

		2019				
2020	2019	Company	2020 (Thousand TL)	2020 (Thousand Usd)	2019 (Thousand TL)	2019 (Thousand USD)
1	1	TURKCELL	29.103.738	4.151.746	25.137.135	4.433.357
2	2	TURK TELEKOM	28.288.875	4.035.503	23.700.000	4.179.894
3	3	VODAFONE	16.761.000	2.391.013	14.848.000	2.618.695
4	4	INDEKS	10.255.020	1.462.913	5.028.329	886.831
5	8	ARENA	5.102.475	727.885	3.074.348	542.213
6	5	TEKNOSA	4.773.055	680.892	3.514.183	619.785
7	7	BILKOM	4.434.949	632.660	3.332.025	587.659
8	9	PENTA	4.206.483	600.069	2.814.977	496.469
9	11	ARMADA	3.101.897	442.496	2.033.079	358.568
10	16	LENOVO	2.894.661	412.933	1.468.380	258.974

Source: BTHaber Bilişim 500 Research Results for 2020

In table 1.5 list of Top 10 Distributors can be found for 2020, this study will cover Indeks, Arena, Armada and the Datagate for a period of 2010-2020. Other firms can not be used in this analysis because their financial statements cannot be found on the PDP for this period. Datagate is a group company of Indeks Bilgisayar but they are listed in the PDP as a sole company. So, their data can be used in the analysis because both Indeks and Datagate financial statements covers only their financial information. Also, Despec is another group company of Indeks but their financial statements started from the 2010 June so their first quarter financial statement is missing in the PDP system. Because of they started to be listed in the Borsa Istanbul Stock Exchange (BIST) in November 2010 they cannot be used in this study.

**Table 1.5:** List of Top 10 Distributor Companies of Bilişim 500 Based on the Sales Revenue

2020	Company	TL Sales Revenue
1	İNDEKS BİLGİSAYAR	10.255.020.022
2	ARENA	5.102.475.000
3	TEKNOSA	4.773.055.401
4	BİLKOM BİLİSİM	4.434.948.885
5	PENTA TEKNOLOJİ	4.206.483.146
6	ARMADA BİLGİSAYAR	3.101.897.311
7	BRIGHTSTAR	2.345.708.311
8	MOBİLTEL	1.898.692.503
9	DATAGATE BİLGİSAYAR	1.699.475.494
10	DESPEC	658.571.089

Source: BTHaber Bilişim 500 Research Results for 2020

## **CHAPTER 2**

### **2. LITERATURE SURVEY**

There can be found many studies conducted for the relationship between working capital management and the profitability of firms for different countries. They mostly consider inventory management as a part of the working capital management. Although there are lot of studies conducted in this area smaller number of studies can be found mainly dedicated to find the relationship between only inventory management and the profitability. Especially there can be found less study for the Turkish Information Technologies companies inventory management and the profitability relationship. But none of the studies are covered only the distributors. This research is mainly differed from the literature by only focusing on the distributors and the aim is in this research finding the effects of inventory management on the firm's profitability by only in Turkish Information Technologies Distributors which operated in Borsa Istanbul Stock Exchange.

In literature, studies mainly focused on the working capital management on corporate profitability in different countries and most of them concluded almost the same results. Most of the results shows that keeping working capital in an optimum level can increase firm's profitability and there is a strong negative correlation between profitability and the number of day's accounts receivable, inventories and accounts payable.

Saglam and Kagitci (2016) Researched the impact on company profitability of WCM. For the period 2003-2013, they have sampled 106 companies listed on the BIST. They conclude that gross operating profit is negatively correlated with accounts receivable. Study also concluded that the connection between gross operating profit and the number of days

of inventory is positive. But there is no affect the profitability of firms in the study at a significant level. They used descriptive statistics and regression analysis. In their analysis profitability is the dependent variable for all models.

Deloof (2003) researched the relationship between WCM and profitability. He used 1009 large Belgian nonfinancial companies' data for the period of 1992-1996. Inventories, accounts payable and number of day's accounts receivable are the measures of his study. WCM measured with the cash conversion cycle. Deloof concluded that, there is a strong negative correlation between profitability and the number of day's accounts receivable, inventories and accounts payable. The result of his study says that firms can increase their profitability by reducing the number of day's accounts receivable and inventories. His study is one of the most cited paper in this area.

Shin and Soenen (1998) analyzed the effect the relationship with working capital management and profitability of the business. The main research problems are whether there is a relationship between the efficiency of working capital management and the profitability of the company. In order to find the relationship, they investigated whether a short cash conversion period is beneficial to the profitability of the company. For this purpose, they used 58,895 financial data of the companies between 1975-1994. First, correlation analysis has been conducted between net trade cycle, current ratio, return on assets, profitability, leverage ratio, growth rate of sales. A negative correlation was found between the current ratio and the return on assets of the enterprise. It has been found that there is a negative relationship between the length of the net trade conversion period and the profitability of the firm and the debt ratio.

Lazaridis and Tryfonidis (2006) from Greece studied the correlations between working capital and profitability within the 2001-2004 period. They have analyzed 131 companies from the Athens Stock Exchange. Results of their research showed that there is statistical significance between profitability and cash conversion cycle. Variables are through gross operating profit, and the cash conversion cycle. They found a statistically significant correlation between profitability and cash conversion cycle. Managers might boost profitability by keeping working capital components at an optimal level, according to their findings.

Raheman and Nasr (2007) studied the 94 Pakistani companies which are listed in Karachi Stock Exchange for a period of 1999-2004. They studied the relationship between the WCM and the profitability. Average collection period, cash conversion



cycle and current ratio were the variables for the working capital management. And with these variables they have conducted correlation analyses with the profitability. They found strong statistically negative correlations between working capital components and profitability. They find increased cash conversion cycle results in a decrease in the profitability of the company and negative correlation between profitability and the current debt ratio.

Gill et al. (2010) studied profitability and the WCM for an 88 American company which listed in New York Stock Exchange for a period of 2005-2007. Study showed that delaying collection of accounts receivable decreases the corporate profitability. Shortening the term of maturity could increase the profitability. His study did not show any significant statistically correlations between average collection period and number of days in inventory.

Garcia-Teruel & Martinez-Solano (2007) conducted research with the 8,872 small medium enterprises listed companies of Spain stock exchange with period of 1996 to 2002 to test the effects of working capital management on Small and Medium-Sized Enterprise profitability. Their results show to managers that decreasing inventory levels and number of days receivables firms can create value and increase the profitability.

From Turkey, Bahçivanoğlu (2019) studied the relationship between stock levels and the sales in sportswear retail business. In the study almost every product in the stock investigated and compared in different shops. The findings show that sales and inventories have a strong correlation, and this is generally a positive relationship. The study shows that an increase in stocks have a positive effect on sales.

Işık (2017), studied the determinants of profitability in real sector firms in Turkey. He used panel regression analysis. The study period covers 2005 to 2012 and the studied companies are selected from the BIST real sector. Results indicate that profitability mostly determined by firm size, age, stock return volatility and debt ratio. The study shows that there is a positive relationship between profitability and firm size. The volatility of stocks and profitability of small firms are also negative.

Another study from Turkey, Doğan and Topal (2016) analyzed the impacts of specific company factors on profitability of 136 firms traded on the BIST for the time-period 2005–2012. Analysis method was panel data analysis, and the study shows that while enterprise size is positively and significantly correlated to return on assets and

return on equity, financial leverage in the asset and equity rates in the manufacturing industry is negatively related.

Korkmaz and Karaca (2014) 78 Turkish companies listed in the BIST have been analyzed. For the period 2000-2011, fixed and random effects models were used to find the effects of business specific financial parameters on the profitability of Turkish industrial enterprises. The conclusions reveal the important financial ratios that explain the return on assets as well as return on equity, such as the debt-to-total-asset ratio, the fixed-asset-to-total-asset ratio, the tangible asset-to-long-term-liabilities ratio, and the net sales-to-current-asset ratio.

Mwangi (2016) for the 10-year period 2006-2015, six distribution companies from Kenya Breweries Beer have been studied in Nairobi. Study suggests that Kenya Breweries Beer companies have a strong relationship between inventory management and profitability. The study also found that the period of the inventory conversions influences operating cash flows positively and in conclusion Kenya Breweries Beer distribution companies in Nairobi have a positive influence on the number of inventory days.

Coskun and Kok (2011) investigated the 74 Turkish manufacturing companies listed in BIST Period of the study covers 1991-2005 and it measures inventory period, accounts receivable and accounts payable period, working capital policies and cash conversion cycle. Research method is dynamic panel data analysis, and it is concluded that companies may increase their profitability by reducing their account receivable period and inventory period. To put it another way, the cash conversion cycle, accounts receivable period, and inventory period all have a negative correlation with profitability, and the accounts payable period has been identified.

Dizgil, Eda (2020) studied the 9 Turkish Information Technologies companies which is operated under Borsa Istanbul Stock Exchange period of 2009-2017. Data captured from companied balance sheets and the income tables. The objective is to identify the factors that affect working capital. Using panel analysis, it was discovered that the working capital ratio and business size had a substantial association with the cash return period and short-term debt period. This study is important for my research because it focuses on the same sector, but the study method and the main objectives are different.

Ayturk and Yanik (2015) studied the working capital and profitability relationship on Turkish SMEs. Sample consists of 1.123 Turkish SMEs for a 5-year

period of 2009-2013. Research data gathered from the Bureau Van Dijk's Orbis database for 5 year. Dependent variable is profitability and independent variable is working capital management. Generalized Method of Moments and dynamic panel analyze methods used in the study and the results shows that there is a negative relationship between cash cycle and profitability. Finding of this study is consistent with the literature. It demonstrates that the cash cycle and profitability have an adverse, significant, and persistent relationship. In other words, efficient management of the working capital and reducing the cash cycle increases profitability.

Nastiti et al. (2019) In their study, 136 Indonesian manufacturing companies listed on the Indonesian stock exchange tried to establish a relationship between the work capital management and profitability. The study data cover the years 2010 to 2017 and the model of the study includes the regression of data panels and models of fixed impact estimation. Sustainable growth is the dependent variable while the independent variable is managing work capital. The results concluded that WCM has a direct effect on profitability with STATA version 14. In order to increase their profitability, the study recommends that companies should focus on their working capital management.

Mohammad (2015) for a period of 8 years 2006 to 2013, the study covers of 30 non-financial companies listed on the Iraq Stock Exchange. Companies selected from manufacturing, agriculture and service sectors. The goal of the study is to determine the link between profitability and working capital management. Data collected from the financial statements and the annual reports of 30 firms. Cash conversion cycle and return on assets is used to measure the firm's profitability. Furthermore, number of days inventories, number of days accounts receivable, accounts payable used in the analyses. Pearson correlation, ordinary least square and random generalized least square models employed in the study According to the study, cash conversion and return on assets have a favorable link, and Iraqi managers may increase their profits by expanding the cash conversion cycle.

Kendirli and Konak (2014) looked into the relationship between management of working capital and performance of the 18 Turkish company in the Food and Beverage sector listed on the Istanbul Stock Exchange. Study covers 4 years of 2008-2012 financial statements from the PDP. Regression analysis conducted in the study and the dependent variables are return on assets and return on equity, independent variables are accounts receivable turnover rate, inventory turnover rate and cash conversion

cycle used. Also, Tobin's q analysis conducted. Kendirli and Konak concluded that the relationship between cash conversion cycle and the accounts receivable turnover rate are negative in terms of 10%.

Dogan and Elitas (2014) in order to find determinants of working capital, 15 companies listed at Borsa Istanbul Stock Exchange in the food sector were studied. The 2006 to 2012 data period and the multiple regression analyzes, and correlation models used for empirical analysis. Financial statements and corporate income statements used in the analysis. finding shows that cash flows cash conversion cycle and return on assets have a positive relationship with working capital ratio. Moreover, company size and leverage ratio are in a negative relationship.

Eskin and Guvemli (2020) investigated the working capital components and profitability of 33 Turkish non-financial firms listed in Borsa Istanbul Stock Exchange period of 2012 to 2016. Companies selected from BIST 50 and 33 of them selected then these companies divided in 11 different groups according to their main sector. Data for the study gathered from PDP and financial statements, non-financial data used in the analyses. Profitability, cash conversion cycle, company size, number of employees, net sales and liquidity data are collected and converted to five-year average. These data analyzed in SPSS V20 as correlation and regression analyses. Findings are there is a strong link between company age, return on assets and the profitability. This illustrates the impact of the company's life cycle on profit generation. On the other hand, the cash conversion cycle, income and return of assets do not have any relation to each other. One predictable result is when number of employees increases the company's asset size tends to increase.

Lee (2009) analyzed the relationship between the firm's performance and the role of firm size effects on profitability. Lee studied 7158 firms listed in US stock exchanges during 1987 to 2006. Almost twenty years of data makes this study is important. When a number of company and industry specific characteristics are maintained constant, a fixed-effects dynamic panel data model finds that profit rates have a non-linear positive relationship with business size. Furthermore, when firm-specific fixed effects are present, industry-specific fixed effects have a limited impact. The findings show that the relationship between market share, profitability, net income and total assets has been positive.

Nunes et al. (2009) in Portugal studied the determinant of profitability with dynamic and static panel models. Study covers 1999 to 2003 data for Portuguese 75

firms in the service sector. The results demonstrate that the drivers of service businesses' profitability include liquidity, revenue, financial leverage, and tangibility. Study reveals the size of the company, and the sales are in positive correlation related to profitability.

Ani et al. (2012) studied the working capital management and the profitability relationship on top four multinational Beer brewers. Data measurement covers 2000 to 2011 of 12 years. Regression analysis shows that the cash conversion cycle, sales growth, and shorter collection periods all have an impact on the profitability of beer brewing companies. The empirical findings reveal that there is a positive association between the cash conversion cycle, sales growth rate, and profitability of top four beer brewers, implying that the cash conversion cycle and sales growth rate are effective determinants of the sector's profitability. Multiple regressions support this conclusion, confirming statistically that the cash conversion cycle and sales growth rate have a significant impact on the profitability of the world's top four major beer brewing enterprises. As a result, decreasing the cash conversion cycle and increasing sales improves the profitability of world-class brewers significantly.

Abdulasheed et al. (2011) reviewed the inventory management in Nigeria, Kwara state in 6 small businesses. Secondary data was gathered over a ten-year period from the books of selected small companies in Kwara State. Analyze conducted via the SPSS program. The association between inventory management and performance was investigated using a linear regression model and the results suggest that change in stock would affect the profitability of small firms. Thus, there is a positive relationship between profitability and inventory of small companies in Kwara Nigeria. According to the study small enterprises are more likely to have more profit when efficient inventory management conducted.

Bicen and Sezgin (2017) conducted research in the Borsa Istanbul Stock Exchange Information Technologies industry to find a connection between financial ratios and corporate value. The study includes 33 various analytical variables, data gathered from [www.finnet.com](http://www.finnet.com) and the study period is 2005 to 2015. The model establishing in the paper's analysis using annual data is used as explanatory variables to explain net income growth, net sales increase, capital growth rate, long-run growth rate, stock turnover, equity/real asset rate, profit-per-share ratio, market value/book rate, and dummy for 2008 and 2013 political events. The results demonstrate a positive impact on the company's value, the net sales increase, profit per share, and market

value/book value. However, the long-term debt increases rate and dummy effects on business value in the 2008 crisis have a negative effect.

In Poland Golas (2020), examined WCM and return on assets in 76 Polish milk and cheese manufacturing companies. The 2008-2017 were the data period and analyzes data collected by the Polish companies in Emerging Markets Information Services. Variables are inventory days, days off sales, days outstanding payable, the cash conversion cycle and asset returns. Study shows that the extension of the inventory and cash conversion cycle days on the revenue of assets based on a panel regression analysis has a negative impact.

Quadri (2008), the link relationship between the management of WCM and profitability in Nigerian consumer goods enterprises was studied by Quadri. Study objectives are determining the impact of inventory holding period on consumer products manufacturers' profitability in Nigeria, determining the impact of accounts receivables collection on consumer goods manufacturers, effect of payable payment period on profitability and investigate the relationship of the cash conversion cycle on the profitability of Nigerian consumer products companies. To find out these objectives study conducted a descriptive analysis, pairwise correlation and generalized least square technique with financial statements of the consumer firms in Nigeria. Study period includes data of 2011 to 2016. Quadri reveals with this study that working capital management is very important for profitability of consumer goods companies. Average collecting period and average payment duration is linked with profitability in a positive affect while inventory holding period and cash conversion cycle has a negative impact on profitability. For my study point of view this study is important because it shows that firms can create more profit by reducing the payment terms and the holding inventory periods.

Qureshi (2015) The management of working capital and the profitability of Karachi stock exchange companies in the cement sector were examined from Pakistan. For the period from 2009 to 2019, 5 companies were selected. The main objective is to determine the relationship between the management of working capital, company profitability and profitability impacts. Return on asset is chosen as the dependent variable in the study, independent variables are chosen as working capital management, average collection period, average payment period, average inventory turnover and the cash conversion cycle as many other studies in the literature. Control variable is liquidity of the firm chosen. These variables, used in correlation and

regression analysis and the results show that, while the current ratio has a large impact on the return on assets, an average collection period and cash conversion cycle have considerable effects. The study's findings also demonstrate that the average payment term and average inventory turnover have no substantial impact on return on assets.

Kheiri et al. (2017) investigated 120 Tehran Stock Exchange listed companies in order to find the relationship between the working capital management on firm's profitability. The variables are the mean receivables collection period, inventory turnover, the mean payment period and the cash conversion cycle on profitability. Furthermore, the control variables were used with two variables of current ratio and company size. Study covers data period of 2009 to 2014. Eviews software used for the analysis and according to this study the results show that the working capital management variables and the profitability of companies are related significantly negatively. This can increase profitability and create added value for shareholders in the cash conversion cycle.

Gudelci (2016), is the only fertilizer sector research study for analysis on the management and profitability of working capital management. According to the study there is only 3 fertilizer companies listed in BIST and these companies is studied in this paper. Data period is 2006-2015 and financial data collected from [www.finnet.com](http://www.finnet.com) starting from 2005 first quarter to 2015 3rd quarter. Analysis done by SPSS 16.0 and the variable used in this study are, asset turnover rate, receivables turnover, inventory turnover, trade debt turnover, current ratio, and profitability. Unlike other studies Gudelci suggests that there is no relationship can be found between the working capital and the profitability of firms. This result makes this paper interesting and distinguishes it from others in common papers.

Dincergok (2009) from Turkey investigated the working capital and the profitability relations in 25 Istanbul Stock Exchange firms listed in chemical, petroleum sectors. This is the only study in Turkish literature in terms of the relations on the profitability of these sectors makes this paper important. Data for the analyses captured from the PDP financial statements and for a period of 2005 to 2016. Current assets in these sectors according to the financial statements is almost 70% of the total assets. In this study variables are receivable collection period, inventory holding period and debt payment terms and these data are studied via dynamic panel analysis used. Study results suggested that relationship between receivables, trade payables, and

profitability ratios is nonlinear and concave. The findings of the inventories do not match the theoretical expectations. This may occur because of the studied sectors.

Ilgun et al. (2017) from Turkey examined the importance and the degree of knowledge of the stock control, the inventory management systems in the companies. A different methodology applied this study rather than the other studies in the literature and the methodology was survey and face to face interviews. Total of 32 companies selected which registered in Kocaeli Chamber of Industry and face to face interviews done with more than one participant from each company. With this method 78 data captured via the surveys and then analyzed using SPSS software. Questionnaire consists of a total of 25 questions about education status, the sector and field of activity of the enterprise, the duration of activity and the number of personnel employed. In the study, it has been tried to determine the stock status of the enterprises, their stock holding costs, their preferred stock control methods, stock management systems, knowledge levels about stock management systems and to what extent they are applied. In the results, almost 90% percent of the companies who joined to surveys keep stock to avoid of loss of not-holding inventory costs.

Another study from Turkey is Albez et al. (2018), and they studied the importance and the effects of inventory management in the success of companies. 32 companies studied from BIST, randomly from manufacturing sectors for a period of 2009 to 2016. Rate analysis and trend analysis applied in the study and the data collected from PDP. Variables were including such as inventory levels, cost of goods sold and profits. Results shows that inventory costs are reducing during the analysis period, and sales and asset expansion are in parallel with overall economic growth, even though the main activity's profitability is little increase. At the end this study suggested the managers that if they imply a good management of inventory, they can increase their sales and profits.

Sekeroglu (2014) The link between inventory management and profitability was investigated in Turkish enterprises that operate in the weaving, eatables, wholesale, and retail industries in the Borsa Istanbul stock exchange. There are 16 weaving companies, 14 are eatables and 11 are chosen for this research in the wholesale and retail industries. The 2003-2012 data period includes the profitability and inventory turnover ratios of the variables. Data collected from the PDP balance sheets and income statements and analyzes made via the SPSS-20. To identify the relationship between inventory and profitability, Sekeroglu conducted the regression and correlation



analysis. In results, it has been determined that inventory management and profitability in the eatables industry have a statistically positive relationship while there is no relationship can be found statistically between inventory management and profitability in weaving and wholesale industry.

Anton et al. (2020) 719 Polish Stock Exchange companies in Warsaw covered the study for the period 2007-2016 were studied to find the relationship between working capital management and the profitability. Fixed effects, ordinary least squares models used in the study. The study found that there is a U-shape positive relationship between working capital and profitability, which is showing working capital has a positive impact on Polish firm profitability up to the break-even point. After the breakthrough, working capital management has a negative impact on company profitability.

There are many different studies developed in the literature review to determine the relationship between the working capital stock and the profitability of companies. In these studies, different data models have been used. Correlations and regression analyses, data analysis and correlation analyses by Pearson are three most frequently used data models.

In conclusion, the management of WCM and profitability in different countries have been studied. In literature most of the study concluded that profitability and the working capital management are strongly related, and managers can increase precious profitability of their companies by implementing efficient inventory management methods. Almost all studies in the literature only investigate the relationship between profitability and the working capital management, inventory management is only a part some of these researches. The main difference that distinguishes this study to others in literature is that only inventory management and the profitability will be investigated, the second reason is in literature there can be found many different studies for different sectors but there is no study can be found directly analyzed only the Turkish IT Distributors inventory management and profitability relationship. In table 2.1 list of brief literature summary can be found.

**Table 2.1:** Summary of literature review

<b>Author</b>	<b>Publis h Year</b>	<b>Country</b>	<b>Analyzed Company Number</b>	<b>Research Period</b>	<b>Methodology</b>	<b>Findings</b>
Saglam and Kagıtcı	2016	Turkey	106	2003-2013	Descriptive statistics and Regression analysis	No effect on profitability but negative correlation between gross operating profit and Accounts receivable
Deloof	2003	Belgium	1009	1992-1996	Correlation and regression analysis	Negative correlation profitability and inventories, AP
Shin and Soenen	1998	Korea	58.985	1975-1994	Correlation and regression analysis	Negative correlation net trade cycle and profitability
Lazaridis and Tryfonidis	2006	Greece	131	2001-2004	Pearson correlation and regression analyses	Negative relationship between profitability and cash conversion cycle
Raheman and Nasr	2007	Pakistan	94	1999-2004	Pearson correlation and regression analyses	Negative relationship between WCM and profitability
Gill et al.	2010	American	88	2005-2007	Pearson correlation and regression analyses	No correlation between average collection and days in inventory
Garcia and Martinez	2007	Spain	8.872	1996-2002	Panel data methodology	Negative correlation WCM and profitability
Bahcivano glu	2019	Turkey	1	-	Regression model	Positive correlation on sales and profitability
Isik	2017	Turkey	153	2005-2012	Panel analysis	No significant impact on profitability
Dogan and Topal	2016	Turkey	136	2005-2012	Panel data analysis	Negative correlation returns on assets and return on equity

**Table 2.1 (continued)**

Korkmaz and Karaca	2014	Turkey	78	2000-2011	Panel regression analyses	Negative correlation WCM and profitability
Mwangi	2016	Kenya	6	2006-2015	Ordinary least square, regression analyses	Inventory management significantly impact on profitability
Coskun and Kok	2011	Turkey	74	1991-2005	Dynamic panel data analyses	Negative correlation between AP and inventory period
Dizgil	2020	Turkey	9	2009-2017	Panel analysis	Strong connection between WCR and short-term debt period
Ayturk and Yanik	2015	Turkey	1123	2009-2013	GMM and dynamic panel analyses	WCM influences profitability
Nastiti et al	2019	Indonesia	136	2010-2017	Panel regression	WCM directly affect profitability
Mohammad	2015	Iraq	30	2006-2013	Pearson correlation, ordinary least square	Positive relationship cash conversion and return on assets
Kendirli and Konak	2014	Turkey	18	2008-2012	Regression analysis and Tobin's Q analysis	Negative correlation between CCC and accounts receivable turnover rate
Dogan and Elitas	2014	Turkey	15	2006-2012	Multiple regression analysis and correlation models	Positive correlation CCC and working capital ratio
Eskin and Guvemli	2020	Turkey	33	2012-2016	Correlation and regression analysis	Link between return on assets and profitability
Lee	2009	US	7158	1987-2006	Fixed effects dynamic panels	Positive correlation between market share, profitability and total assets
Nunes et al.	2009	Portugal	75	1999-2003	Dynamic panel models	Size of the company and the profitability in positive relation

**Table 2.1 (continued)**

Ani et al.	2012	Nigeria	4	2000-2011	Regression analyses	Reducing CCC and increase in sales may increase profitability
Abdulrash eed et al.	2011	Nigeria	6	10 years	Linear regression model and SPSS	Positive relationship between profitability and inventory levels
Bicen and Sezgin	2017	Turkey	31	2005-2015	Fisher Panel Philips and Perron test	Net profit growth positive impact on company value
Golas	2020	Poland	76	2008-2017	Panel regression analysis	Negative correlation extending days sale of inventory and CCC
Quadri	2008	Nigerian	-	2011-2016	Descriptive analysis,	Average collection and payment is linked directly profitability
Quareshi	2015	Pakistan	5	2009-2019	Correlation and regression analyses	Average collection period, CCC and inventory turnover effects on profitability
Keiri et al	2017	Iran	120	2009-2014	Eviews software	Negative correlation between working capital and profitability
Gudelci	2016	Turkey	3	2006-2015	SPSS 16.0	No relationship between working capital and inventory
Dincergok	2009	Turkey	25	2005-2016	Dynamic panel analysis	AR and profitability is nonlinear
Ilgun	2017	Turkey	32	-	Survey and face to face interviews	This research is testing the inventory management knowledge of managers
Albez	2018	Turkey	32	2009-2016	Rate analysis and trend analysis	Shows strong relationship between inventory and profits

**Table 2.1 (continued)**

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Sekeroglu	2014	Turkey	41	2003- 2012	SPSS correlation and regression analyses	20,	Positive relationship between inventory management and profitability
Anton et al.	2020	Poland	719	2007- 2016	Ordinary least squares models	WC until break point there is positive impact on profitability, after break point it is negative	

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## **CHAPTER 3**

### **3. DATA AND METHODOLOGY**

#### **3.1 Data**

The main objective of this study is to find how inventory management effecting the profitability of Turkish IT distributors. Study will focus on the four Turkish Information Technologies distributors which listed on Istanbul Stock Exchange XBLSM Index (Borsa Istanbul (BIST)). Study only covers only four companies because there are not much companies' data are available in the given study period and also this study will only analyze the distributor firms in the sector and not included the resellers on listed in the BIST. The study will cover a period of 10 years from 2010-2020. Data for the study gathered from the companies' balance sheets and income statements from the Public Disclosure Platform (PDP) database, which contains financial information on all stock exchange firms. Quarterly financial reports used for the research. Profitability is the dependent variable in this study, and it will be calculated by Change in Gross Profit Margin, inventory management is the independent variable and calculated by; Change in Inventory Turnover Days, Change in Account Receivables Turnover Days and Change in Sales and the change in stocks.

In this study relationship between inventory management and the profitability will be investigated via 4 Turkish IT distributors listed in Borsa Istanbul Stock Exchange XBLSM Index. In table 3.1 listed companies are shown. Only these four companies will be investigated because regarding the 2010 to 2020 period these four companies' financial reports are available and there is no other Distributor firm can be found in this period in the BIST with available financial statements. There can be

found many other companies listed in the BIST IT sector, but this study will only focus on the distributors.

**Table 3.1:** List of studied companies

No	Company Name	BIST Name	Year of Establishment	Year of Entry to BIST	Age
1	Indeks Bilgisayar	INDES	1989	2004	33
2	Armada Bilgisayar	ARMDA	1989	2006	33
3	Arena Bilgisayar	ARENA	1991	2020	31
4	Datagate Bilgisayar	DGATE	1992	2006	30

**Table 3.2:** 2020 Bilişim 500 Distributor Rankings according to the Sales Revenues

2020	Company	TL Sales Revenue
1	İNDEKS BİLGİSAYAR	10.255.020.022
2	ARENA	5.102.475.000
3	TEKNOSA	4.773.055.401
4	BILKOM BİLİSİM	4.434.949.885
5	PENTA TEKNOLOJİ	4.206.483.146
6	ARMADA BİLGİSAYAR	3.101.897.311
7	BRIGHTSTAR	2.345.708.311
8	MOBİLTEL	1.898.692.503
9	DATAGATE BİLGİSAYAR	1.699.475.494
10	DESPEC	658.571.089

Source: BTHaber Bilişim 500 Research Results for 2020

In this study Indeks, Armada, Arena and the Datagate will be studied for a period of 2010 to 2020. Datagate is a group company of Indeks but their financial statements are published as sole companies and also, they are listed in BIST as two separate companies. So, they can be analyzed in this study. Another Indeks group company of Indeks is Despec but their financial statements did not cover the studied period they did not added in this study. These companies are the biggest companies in their sector as can be seen from the Table 3.2. They are not only the top ten in 2020 also starting from 2008 they were always the biggest players in their own sector. Other companies

did not include for this study because some of the companies do not list in the BIST and their financial data cannot be found on the PDP. Penta is also another big company in the sector, but they listed on the BIST in 2020 so they cannot be included in this study. All four companies use First-in, First-Out accounting methodology while managing in their inventories. FIFO means that the oldest stock items are recorded as sold. As this is directly affects the Cost of Goods Sold line in financial statement, there is no problem with the study because all four companies methodology of keeping records is the same. The biggest limitations in this study is the lack of information for the value business and volume business levels. Because all the financial statements for 4 companies are includes the consolidated numbers in the quarter. Since there is no volume and value business distinction we have to study the companies with their consolidated values.

### **3.2 Research Model**

This research focus is to find the inventory management effects on the profitability via four Information Technologies Distributors which are listed in the Borsa Istanbul Stock Exchange. After reviewing the literature profitability variable is chosen as the dependent variable of this study. Furthermore, profitability will be measured by the Change in Gross Profit Margin in this study. The gross profit margin shows how much gross profit each sale has earned and is always higher than the profit margin. Inventory Management measurements chosen as Change in Inventory Turnover Days, Change in Account Receivables Turnover Days, Change in Sales and Change in Inventory. After selecting the variables, correlation and regression analysis chosen for the analysis system.



**Table 3.3:** Inventory variable and Profitability variables of study

<b>Profitability Related Variable</b>	<b>Inventory Management Related Variables</b>
Change in Gross Profit Margin	Change in Inventory Turnover Days Change in Account Receivables Turnover Days Change in Sales  Change in Inventory

### **3.2.1. Dependent Variable**

Change in Gross Profit Margin is the profitability measurement of this study. The gross profit margin is a financial measure that shows how effectively a company manages its activities. The ratio or balance between a company's gross profit and the volume of sales achieved in the same period is known as the gross profit margin. Sales prices have a significant impact on gross profit margin and high profitability is better. Gross profit margin will decrease if the cost of goods sold increases, and vice versa (Mahdi et al., 2020). A higher profit margin encourages suppliers, investors, and creditors to put more money into businesses (Gitman, 2002). The gross profit margin is affected by the cost of sales, but not by the company's other expenses. If the gross profit margin is 30%, for example, the company earns 30 TL from every 100 TL in sales after without deducting management, marketing, distribution, depreciation, and financing costs (Khakzad, 2017). This ratio can be used to determine whether the cost of sales in a business activity is high, whether the business is under price pressure, and whether a change in the direction of increase or decrease in the business's sales prices is required. Because the gross sales profit margin is the difference between the revenue generated by the business's core operations and the expenses incurred to run it, boosting the gross sales profit margin is critical to its success (Gucenme, 2005: 96).

In this study, change in gross profit margin is used as a dependent variable for profitability.

$$\text{Gross Profit Margin} = \text{Gross Profit} / \text{Net Sales}$$

$$\text{Change in Gross Profit Margin} = (\text{GP } t - \text{GP } t-1) / \text{GP } t-1$$

### **3.2.2. Independent Variables**

#### **a-) Change in Inventory Turnover Days**

Inventory Turnover Days shows how many times the inventories are converted into cash in a year. A company with a high inventory turnover rate can convert its inventories into cash quickly. It is an excellent measure of how efficiently a company is managing its inventory. The decrease in the inventory turnover rate is an indication that the enterprises have difficulties in converting their assets into money. Generally, a high inventory turnover rate indicates that the company has good inventory management. High inventory turnover gives the business the opportunity to generate more profit. In contrast, high inventory turnover may indicate that there is too little inventory on hand and that inventory often fails to meet sales or production. Such a situation can be costly to the business. On the other hand, a very low inventory turnover rate can result in outdated, damaged, unused, etc. existing inventories. For a company that having a high inventory turnover may operate at a lower current ratio, and that lower ratio may not prevent the entity from meeting its obligations. A business with a high inventory turnover is more fortunate in terms of competition. Such a business can increase its sales volume by reducing its profit margin. The increase in sales volume ensures that the profit of the business increases despite the decrease in the profit margin. However, an increase in inventory turnover does not always allow the business to generate high profits. Increasing sales with a low profit margin may result in an increase in cost of production and selling expenses more than an increase in profit. In such a case, an increase in the inventory turnover rate of the enterprise may decrease the profitability (Kiracı, 2009).

$$\text{Inventory Turnover Rate} = \text{Cost of Goods Sold} / \text{Inventory}$$

$$\text{Inventory Turnover Period (ITP)} = 365 / \text{Inventory Turnover Rate}$$

$$\text{Change in Inventory Turnover Days} = (\text{ITP}_t - \text{ITP}_{t-1}) / \text{ITP}_{t-1}$$

#### **b-) Change in Account Receivables Turnover Days**

Account Receivables Turnover Days variable represents the average number of days that the firm takes to collect payments from its customers sales on credit. And it gives an information about the liquidity and the collectability of the firms.

The high account receivables turnover ratio shows the high ability of the businesses to collect their receivables and reflects the success of the business. It shows that the receivables of the enterprises need less funds for financing of the business. In other words, businesses that collect their receivables with a high turnover rate may need less working capital. The less rate of account receivables turnover indicates that businesses can face problems in the collection of their receivables. It also shows the weakness of the competitiveness of the enterprises and the inadequacy of the collection policy. Businesses with low account receivables turnover days need more funds to finance their receivables, and in this case, more working capital may be needed.

$$\text{Account Receivables Turnover Days} = (\text{Trade Receivables} / \text{Net Sales}) * 365$$

$$\text{Change in Account Receivables Turnover Days} = (\text{AR } t - \text{AR } t-1) / \text{AR } t-1$$

#### **c-) Change in Sales**

The rise in sales during a given time period is referred to as a change in sales. Sales growth is one technique to assess a company's current performance as well as its potential for future growth. Higher growth rates, which can enhance a company's cash flow and consequently profitability, are often seen positively by investors. Change in sales can show the future demand for a company's products or services.

$$\text{Change in Sales} = (\text{SG } t - \text{SG } t-1) / \text{SG } t-1$$

#### **d-) Change in Inventory**

Change in inventory is the increase in inventory over a specific period of time. This ratio calculates by subtracting the inventory amount of previous period from the inventory of current period and dividing by the inventory of previous period.

$$\text{Change in Inventory} = (\text{Inv } t - \text{Inv } t-1) / \text{Inv } t-1$$

### **3.3 Methodology**

Sample Selection and hypotheses in this study focuses on the relationship between inventory management and the profitability of four firms operating in Turkish IT distributors listed on BIST. Data for the analysis as follows; quarterly financial reports

collected from the Public Disclosure Platform (PDP) database over a period of 10 years from 2010-2020. which contains financial information on all stock exchange firms This study will employ correlation and regression analysis as many other studies deployed to determine the relationship with inventory management and profitability. The research depends on the financial statements and quarterly reports of listed companies. Profitability measured by change in gross profit margin and inventory management measured by change in inventory turnover days, change in accounts receivables turnover days, change in Sales and change in inventory.

The possible hypothesis in the study are as follows:

H1: Change in inventory turnover days has a significant effect on change in gross profit margin.

H2: Change in account receivables turnover days has impact on change in gross profit margin.

H3: Change in Sales has impact on change in gross profit margin.

H4: Change in Inventory has impact on change in gross profit margin.

The equation model of the study is below.

$$\text{Change in Gross Profit Margin} = \alpha + \beta_1 X1_{i,t} + \beta_2 X2_{i,t} + \beta_3 X3_{i,t} + \beta_4 X4_{i,t} + \epsilon_{i,t}$$

X1: Change in Inventory Turnover Days

X2: Change in Account Receivables Turnover Days

X3: Change in Sales

X4: Change in Inventory

$\epsilon_{i,t}$  : Represent the error term

i: Encodes the firm,

t: encodes the observation time period

In this study correlation and the regression analyses will be conducted to find the effects of inventory management on profitability. This methodology selected because to find the linear relationship between variables examined by correlation and regression analysis.

In the research, the direction and degree of the relationship between inventory management and profitability ratios will be determined by correlation analysis. The main difference between regression and correlation analysis; in correlation analysis, while investigating whether one of the variables affects the other; in the regression analysis, the effect of the independent variable on the dependent variable is investigated (Ulker et al.,2020).

Correlation and regression analysis are the most used models in the literature.

Whether there is a linear relationship between two variables is examined by correlation analysis. Correlation analysis is a widely used analysis technique to show whether there is a relationship or dependency between two variables measured at the level of range and ratio, and if there is a relationship and dependency, its direction and strength (Kiracı, 2009). If the increasing values of one variable are linearly related to the increasing values of the other variable, the variables are positively correlated. If the increasing values of one variable are linearly related to the decreasing values of the other variable, the variables are negatively related. The correlation coefficient “r” can take values between +1 and -1. The closer it gets to “1”, the stronger the relationship. If the coefficient is “0”, it means that there is no visible relationship between both variables. In below table correlation coefficient interval and the related relationship can be found.

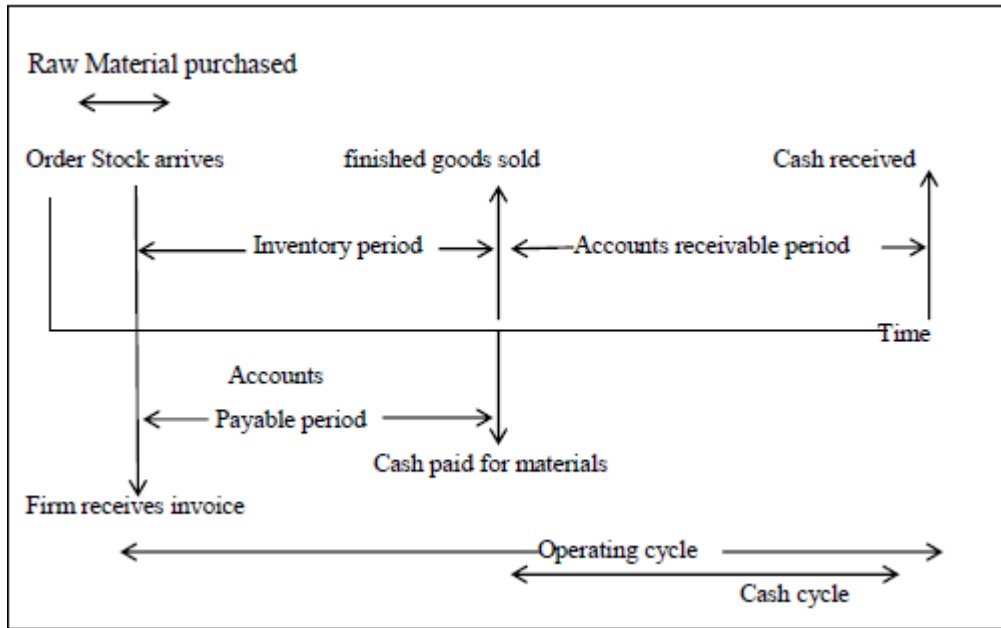
**Table 3.4:** Correlation Coefficient Interpretation

<b>Coefficient Interval</b>	<b>Relationship Level</b>
0.00	There is no correlation between the two variables
0.00 – 0.25	Correlation is very weak
0.25 – 0.50	Correlation is enough
0.50 – 0,75	Correlation is strong
0.75 – 0.99	Correlation is very strong
1.00	Correlation is perfect

### **3.4 Analysis**

In the analysis part relationship between inventory management and the profitability will be investigated. The shortening of the accounts receivable collection period can eliminate the liquidity problem. On the other hand, if the cash conversion period is shortened more than necessary, company will be unable to satisfy its present financial obligations, putting it in financial distress. Therefore, there must be a balance between liquidity and capital tied to stocks and other assets (Ruyken, Wagner and Jonke, 2011). If the inventory turnover rate is too short firm under the risk of out of stock and not satisfying the customer's demand creates risks. On the other hand, if the accounts receivable period is too short, company may lose customers which who are asking to purchase on account for a long period. So, managers must find the optimum stock level while keeping enough stock to meet with the unknown demand and decreasing the tied money to stocks (Çakır,2013).

In the study of Zeidan and Shapir (2017) in which they examined the cash conversion cycle of the real estate company MRV in Brazil for the period 2010-2015, they state that the company reduced its capital requirement by \$1.02 billion when it reduced the cash conversion period from 508 days in 2012 to 351 days in 2015. Shorter accounts receivables collection period and inventory turnover allows it to hold less cash. Therefore, as the conversion period of receivables into cash increases, the cash need of the business will also increase. In addition, the need for cash will increase as the holding of excess inventory will bring an additional burden on inventory costs (Cam, 2006).



**Figure 3.1.** Short term operating activity and cash flow of manufacturing firms

Source: (Hillier et al. 2010)

The operational cycle, according to (Hillier et al. 2010), is the time span between ordering goods and collecting cash from receivables. The cash cycle begins when the firm pays money to a supplier for raw materials and concludes when the firm collects money from debtors. The inventory period plus receivable period minus payment period is the cash conversion cycle in its most basic form. When there is a gap between cash outflows and cash inflows, short-term borrowing becomes necessary. Cash Conversion Cycle is the time between purchasing raw materials or providing services and receiving payment from the sale of those goods or services. CCC with a longer term shows that the business requires more capital to finance its cycle. Short duration, on the other hand, indicates that the corporation has sufficient money to carry out its everyday activities (Mohammad, 2015).

**Table 3.5:** Descriptive Statistics of 4 listed companies in BIST from 2010- 2020 176 Observation

	<b>N</b>	<b>Average</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Max.</b>	<b>Skewness</b>	<b>Kurtosis</b>
<b>GPM</b>	176	0,0537	0,0150	0,0228	0,1040	0,6677	0,5867
<b>ITD</b>	176	120,9637	45,1899	27,2439	252,8136	0,3049	-0,2058
<b>ARTD</b>	176	309,1579	95,5196	137,1229	731,6905	1,1159	2,5791
<b>CS</b>	176	0,0921	0,3333	-0,4857	2,3318	2,5193	11,6698
<b>CI</b>	176	0,0884	0,3191	-0,8345	1,3547	0,9473	1,9157

In table 3.5 Descriptive Statistics of 4 listed companies in BIST from 2010- 2020 quarterly 176 Observation is given.

The average Inventory Turnover Day for the 4 company is 120, and for some companies it takes maximum of 252 days while the minimum values are 27 days. For Accoun Receivable side companies' need minimum of 137 days while having a maximum of 731 days. On average the companies need 309 days and their standard deviation of 95 days. It means that companies are collecting their payments from the customers on average of 309 days and it's a very long time and it may cause a big finance burden to the companies.

### **3.4.1. Correlation Analysis**

In this research the aim is to find the inventory management effect on the profitability of the firms. In order to find this relationship, profitability variable is chosen as dependent variable and the measurement variable is Change in Gross Profit Margin. Inventory management chosen as independent variable and the measurement variables are as follows; Change in Inventory Turnover Days, Change in Accounts Receivables Turnover Days, Change in Sales and Change in Inventory. After selecting the variables, all the data gathered from PDP for four company for a period of 2010-2020. Quarterly financial reports were collected for all years, and the necessary variables are entered into Excel program which the total number of 2816 data. After collecting the necessary data's calculations has been done for the variables. Furthermore, the change in the variables calculated. Lastly the average of these data



collected for every quarter and correlation and regression analysis completed with these data which in total of 220.

In order to find the direction and degree of the relationship between inventory management and profitability ratios correlation analysis were conducted via Excel program.

**Table 3.6:** Correlation Matrix

	<i>CGPM</i>	<i>CITD</i>	<i>CARTD</i>	<i>CS</i>	<i>CI</i>
<i>CGPM</i>	1				
<i>CITD</i>	0,09715	1			
<i>CARTD</i>	0,37030	0,28780	1		
<i>CS</i>	-0,31916	-0,60434	-0,47935	1	
<i>CI</i>	-0,26755	0,46102	-0,25874	0,36471	1

Note: CGPM represent the Change in Gross Profit Margin, CITD—Change in Inventory Turnover Days, CARTD-- Change in Account Receivables Turnover Days, CS--Change in Sales, CI—Change in Inventory

Regarding the Table 3.5 correlation results shows that there is a statistically meaningful correlation can be found between the Profitability and the Inventory Management variables except CITD. According to the correlation analysis, change in gross profit margin and the change in inventory turnover rate relationship is ( $r=0,09715$ ) and it means that surprisingly there is no statistically meaningful relationship can be found between CPGM and CITD. One unit change in CITD will cause a change in CGPM as 0,09% and it is not a strong positive correlation and there is no correlation between the two variables. This result is contrary with the literature (Mwangi 2016; Sekeroglu 2014; Dizgil ; 2020. Shin & Soenen, 1998; Deloof, 2003; Coskun& Kok, 2011; Cakır, 2013; Dursun & Ayricay 2012) In the theory, Inventory turnover rate increase means that more inventories will be sold, and it will eventually increase the sales. When inventory turnover rate increases the inventory holding costs and the burden of financing inventories will decrease and this will show positive effects on the gross profit margins. Therefore, as the change in inventory turnover days increases, businesses can continue their activities with less working capital as they will hold less stock. In other words, the high inventory turnover days results in holding less

inventory on hands. This will increase the gross profit margin of the company. Inventory turnover is a ratio that reveals the rate of conversion of the stock in a year. A higher stock turnover rate firm has the higher sales opportunity. Such a firm lowers its profit margin and can expand sales volume. As a result of expanding sales volume can increase operating profit despite the decrease in profit margin. It the situation is expressed as gain from the demand (Kiracı, 2009).

For the change in account receivables turnover days and the gross profit margin there is a ( $r= 0,37030$ ) positive correlation found in the analysis. This result shows that 1 unit change in CARTD will change 0,37% to CGPM. This result is contrary with some of the prior studies such as (Deloof ,2003; Lazaridis and Tryfonidis, 2006; Garcia-Teruel and Martinez-Solano, 2007). The Account receivables calculates the average number of days it takes to get payment from customers after sale completed. The accounts receivable period ratio is a measure of how liquid a company is. (Ani et al.2012) Companies can increase their profits by shortening the time it to takes the collection of money. Most of the time distributors sell their products to resellers on credit and if they can reduce their collection period of money, they can increase their gross profit margin.

Change in sales and the change in gross profit are in a negative relationship according to the correlation analysis. ( $r= -0,31916$ ). This result shows that 1 unit change in sales will affect CGPM -0,31%. The reason of negative correlation may be explained by the decrease of profit while gaining more sales. Maybe the firms decrease their profit margins in order to increase their demands and sales. Eventually this may cause the negative correlation. This result may also come from the nature of the distributors sales business strategies. Because distributors have two types of sale activities, Volume and Value business. In volume business it's mostly daily sales from inventories and it the amount endorsement of the volume business is less than the project & value business. In value business most of the higher amount of projects issued to customers and this may cause the negative correlation between the sales and the gross profit margin. Because if the firms are decrease their profit margins in order to win big amounts of projects it may eventually decrease the gross profit while increase the sales amount. Moreover, this result also shows that although the net sales have increased, the cost of sales has increased relatively more. (Erdogan, 2020)

Change in Inventory and the change in gross profit margin in a negative relationship according to the correlation analysis. ( $r= -0,26755$ ). This result is contrary

to other studies in the literature (Erdogan, 2020; Kiracı 2009). In other studies, it has been found that there is weak positive correlation between CI and CGPM. This negative result also derives from increase in the cost of goods sold or the value business from the distributors activities.

According to the correlation analysis, there is a statistically meaningful relationship between inventory management and the profitability can be found for the Turkish IT Distributors regarding the chosen dependent and the independent variables for a period of 2010 to 2020. Correlation analysis surprisingly shows that there is no statistically meaningful relationship between Inventory Turnover Days and the Gross Profit Margin but other variables shows meaningful correlation.

### 3.4.2. Regression Analysis

**Table 3.7:** Regression Analysis Results

<i>Regression Statistics</i>	
<b>Multiple R</b>	0,42721
<b>R Square</b>	0,18251
<b>Adjusted R Square</b>	0,09866
<b>Standard Error</b>	0,11095
<b>Observations</b>	44

<b>ANOVA</b>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
<b>Regression</b>	4	0,10718	0,02679	2,17670	0,08960
<b>Residual</b>	39	0,48010	0,01231		
<b>Total</b>	43	0,58728			

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t Stat</i>	<i>P-Value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95,0%</i>	<i>Upper 95,0%</i>
<b>Intercept</b>	0,01611	0,02234	0,72139	0,47497	-0,02907	0,06129	-0,02907	0,06129
<b>CITD</b>	0,02941	0,21645	0,13589	0,89261	-0,40840	0,46723	-0,40840	0,46723
<b>CARTD</b>	0,24879	0,16284	1,52780	0,13463	-0,08059	0,57816	-0,08059	0,57816
<b>CS</b>	-0,03743	0,19871	-0,18838	0,85155	-0,43935	0,36449	-0,43935	0,36449
<b>CI</b>	-0,11210	0,22837	-0,49087	0,62627	-0,57401	0,34982	-0,57401	0,34982

Note: CITD represent the Change in Inventory Turnover Days, CARTD-- Change in Account Receivables Turnover Days, CS--Change in Sales

According to the table 3.7 there is no statistically meaningful relationship can be found between the variables in the regression analysis. Independent variables do not show any statistically meaningful relationship. ( $P < 0,05$ ) all values are over  $P < 0,05$ . The specificity coefficient R square is found to be 0.18251, and it can be said that only 0,17% of the changes in the independent variables will affect the dependent variable Change in Gross Profit Margin. However according to the result of F statistic in which the general significance of the model is evaluated, the model is found to be that there is no statistically meaningful model with where  $p < 0.05$  the result is  $p = 0,08960$ . Regarding these regression results this model cannot statistically explain or show any meaningful results. Although this model shows statistically meaningful results in the correlation analysis, regression analysis did not show any meaningful results. After the unexpected results came out, same study conducted based on the same companies and the same period with the same variables with the data from financial statements of 6 months but the again the results did not show any statistically meaningful model. Also, same methodology used with different variables such as Return on Asset as Dependent Variable but still the results did not show any statistically meaningful model.

According to the regression analysis, there is no statistically significant relationship between inventory management and the profitability can be found for the Turkish IT Distributors regarding the chosen dependent and the independent variables. According to this reason all four-hypothesis rejected.

**Change in Gross Profit Margin** =  $0,016 + 0,029 \text{ CITD} + 0,248 \text{ CARTD} - 0,037 \text{ CS} - 0,112 \text{ CI}$

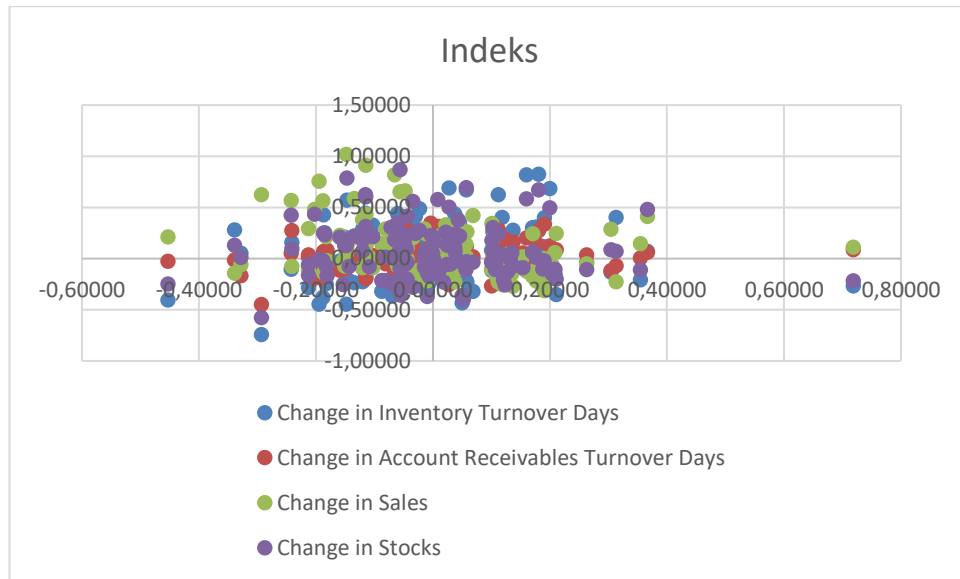
## **CHAPTER 4**

### **4. FINDINGS**

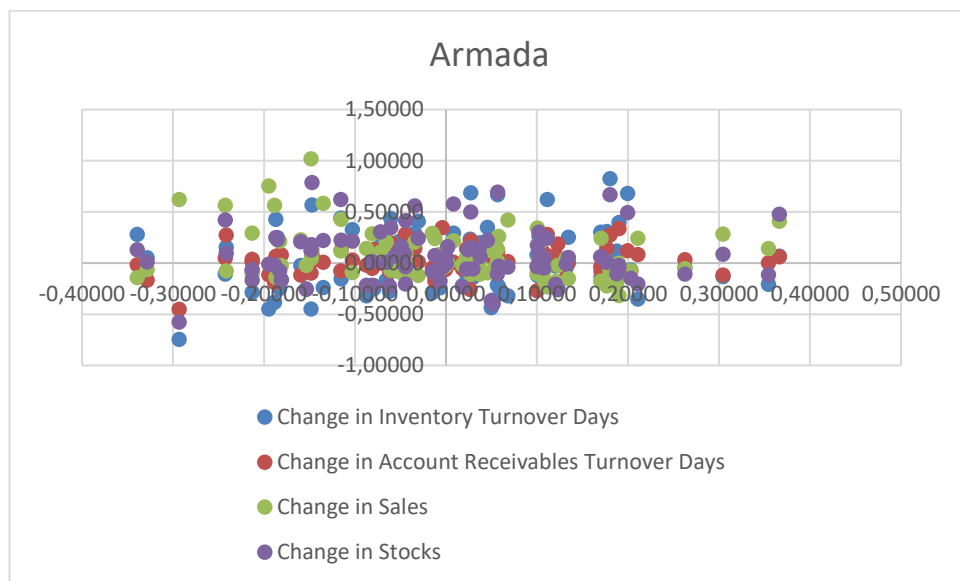
According to the correlation analysis there is a statistically meaningful relationship found between the inventory management and the profitability for four IT distributors in BIST. Results shows that there is a positive relationship between the change in gross profit margin and change in account receivables turnover days. For change in sales and change in stock it has been found negative relationship between the change in gross profit margin. For change in inventory turnover days and change in gross profit margin it has been found that there is no statistically meaningful relationship can be found.

On the other hand, the regression analyses show that there is no statistically meaningful relationship can be found between inventory management and the profitability of Turkish IT Distributors with given variables. According to this result all four hypotheses of this study is rejected. In the literature there are many studies can be found for the relationship between the inventory management and the profitability (Mwangi 2016; Sekeroglu 2014; Dizgil ; 2020 ;Shin & Soenen, 1998; Deloof, 2003; Coskun& Kok, 2011; Cakır, 2013; Dursun & Ayricay 2012).. Some of these studies found positive relationship while some others found negative relationship and also some of the studies found that there is no relationship between the inventory management and the profitability (Saglam and Kagitci, 2016; Gill et al. 2010 ; Gudelci 2016).

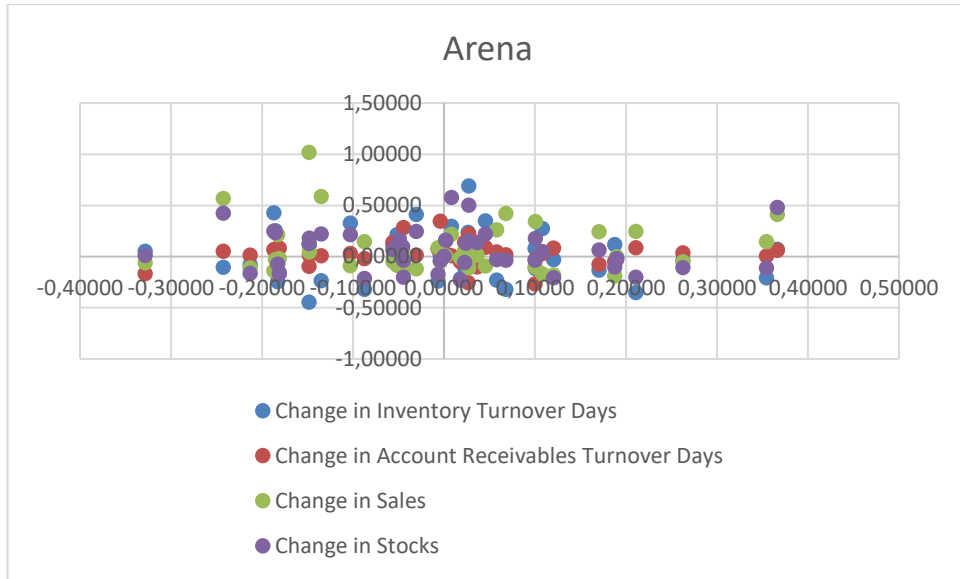
There are some possible reasons why this model does not show any significant relationship between inventory management and the profitability for the Turkish IT Distributors. First of all, the distribution of the data used in the analysis in below figures do not show any statistically meaningful positive or negative correlation.



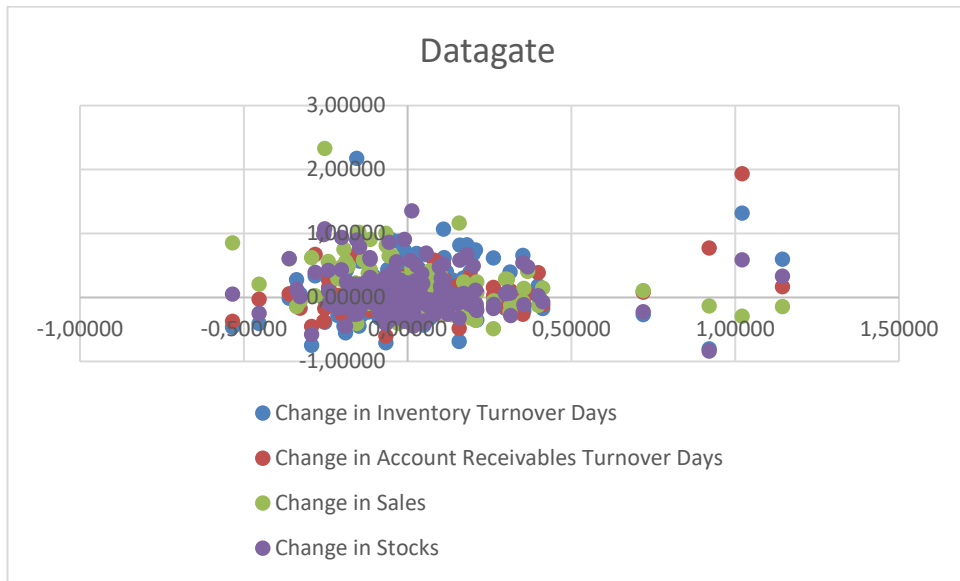
**Figure 4.1:** Indeks Data Distribution



**Figure 4.2:** Armada Data Distribution

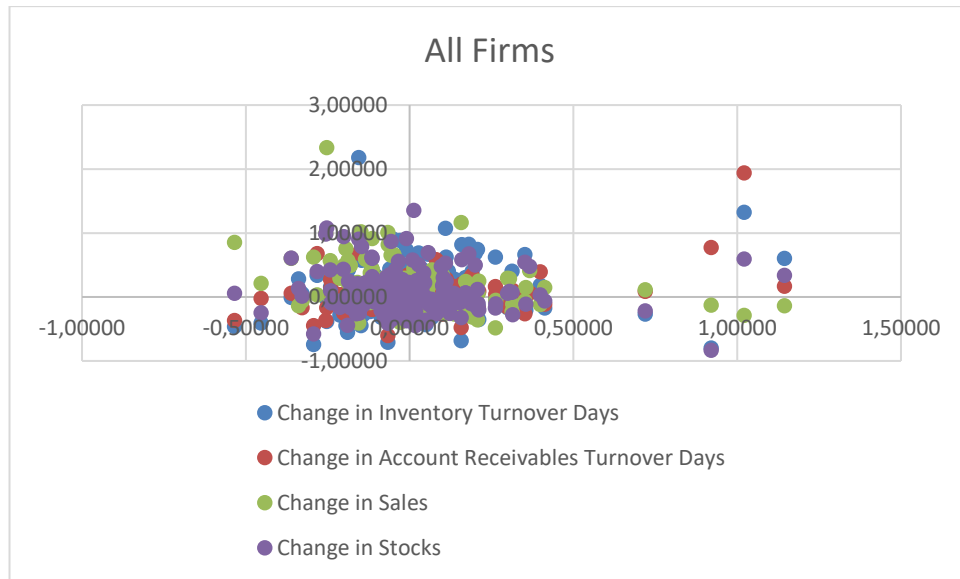


**Figure 4.3:** Arena Data Distribution



**Figure 4.4:** Datagate Data Distribution





**Figure 4.5:** All four firms Data Distribution

This model does not show any significant statistical relationship between the inventory management and the profitability because of Turkish IT distributors unique business conditions are affecting the data used in the analysis. Possible results can be listed as below.

1. Most of the time distributors choose to receive discounts from their suppliers with early payments. For example, manufacturer gives 2% discount to distributor if the payment will be done in 15 days after the invoice issued while the maturity of the invoice normally 30 days. In this way distributor will gain 2% discount for making the payment 15 days earlier then the maturity date of invoice. But on the other side if they are selling the products to the customer with longer maturity their financial costs will increase, and this will affect their accounts receivable. Because they will have to finance the customer for a longer period. Because of this process distributors financial costs may increase and it may affect in accounts receivables and cost of goods sold in their financial statement. In theory if the collection time of money is too long after the purchase of the inventory this may decrease the profitability (Deloof, 2003).
2. Turkish IT Distributors sales activities can be divided by two as Volume and Value Business. These activities may create difference in quarterly reports because of the claiming process. Claiming process is directly affecting the gross profit margin due to the nature of the process itself.

Volume business is the sale activities run by the inventories and distributors purchase their inventory products from the manufacturer by a specified discount price controlled by the manufacturer. These purchased products have high amount of unit costs. Distributors sell those products to their resellers with a lower price than their purchase price. This sale activities are a deficit for that moment because they sell products lower than their purchase price. This is because of manufacturers shares recommended sale price with the distributors lower than their purchase price. Distributors are adding their margin to recommended sale price and then make the sales activities. When the sale is completed, distributor calculate the loss for that transaction and requested the difference between the Purchase Price and the Recommended Sale Price from the manufacturer. And this concept is called Claiming Process. For example: Distributor purchased a product from the manufacturer \$100 and sell the product to a customer with \$84 where recommended price is \$80. So, when the sale completed distributor has  $\$84 - \$100 = \$-16$  loss but in fact  $\$100 - \$80 = \$20$  they will receive claim amount and, in this way, they make their profit from that sale transaction as  $\$20 - \$16 = \$4$ . This process is affecting the financial tables and it's one of the biggest problems in the analyses. Because this claiming process affecting the Gross Profit Margin because the Cost of Goods Sold is misleading in this business and the gross profit margin always shows very low amount of profit in the financial tables.

3. Regarding the claim process, collection of the claim money from the manufacturer takes average of 60 days for the distributors. This is also affecting the companies' financial ratios. Purchasing products from the manufacturer with a higher price, paying the money earlier then the invoice maturity day and holding products in inventory for a period of time creates financial costs to distributors. And with the late collection of claim money also creates an extra financial burden to distributors. So, all of these three circumstances decrease the profitability because of the financial costs increase for the Turkish Distributors. And almost all transactions in distribution sector are made in USD in Turkey, getting a loan from a bank in USD cost is almost 1.8% monthly to the distributors. Also, in the study period between 2010 and to 2020 USD currency always increased in

Turkey. Furthermore, if there is an error made in the claimed amount or if the payment of the claimed amount is rejected for a reason, then the distributor sales activities for that claimed transaction goes into the loss. So all of these activities creates longer periods for accounts receivable and the financial costs to the distributors.

4. In this analysis quarterly, financial reports used for the analysis with the period of 2010-2020 for the four distributors. And it is seen that from the data, for every year and each company the highest sales revenue generated always in the Q4 (October, November, and December). The starting of the year is always having the lowest sales revenue. The revenue is always increasing while moving from starting of the year to the end. This seasonality is affecting the analysis. Q4 has the highest number of sales because it is the last quarter of the year and companies and most importantly the government institutions place orders in order to use their yearly budget. Moreover, also for most of the manufacturer and the distributor side it is the last quarter of the year and in order to achieve their yearly revenue target they are pushing more against earlier quarters. When we look at the Change in Sales data for in the whole data set, this seasonality creates a problem in the analysis. Also, it can be seen in the financial data that while the sales revenue is increasing in the years profitability is not moving parallel to the data. So, it can be said that cost of goods sold increased for the distributors, or they have abandoned some of their profit margins in order to increase their sales revenue.
5. Another reason is that the Value Business can mislead the financial tables. Value business is the project business for the distributors, and it has a special price given by the manufacturer for a project based and it can be only used for the given Distributor > Partner > End User. And it can cost up to million-dollar projects. When a high cost of project- million-dollar sales issued in a quarter this directly affect the financial tables. Furthermore, most of the time project orders are directly shipped to customer without waiting too much in the warehouse of distributor so the products did not hold in the inventory for a long time. These two reasons directly affect the inventory turnover rate, change in sales, gross profit margin and the account receivables. So basically, all the variables used in this analyze is

affected from the big project amounts because it is misleading the variables used in this analysis. For example, \$2 Million project products received in Q3 and only waited in the warehouse for 2 days. After 2 days project products issued to the customer. This \$2M directly affecting the change in sales, inventory and other variables in the analyses.

Regarding above 5 possible reasons this study suggested that this model did not show statistically meaningful relationship between inventory management and the profitability for the four Turkish IT Distributors between 2010 to 2020. According to the results, Change in Inventory Turnover Days, Change in Account Receivables Turnover Days, Change in Sales and Change in Inventory did not statistically effect the Change in Gross Profit Margin.

In the literature there can be found many studies according to the effect of working capital management and the profitability of firms, but smaller number of studies can be found directly looking into inventory management and the profitability relationship. Especially for the Turkish Information Technologies sector there is far less studies can be found. This research only dedicated to the Turkish IT Distributors in the BIST for a period of 2010 to 2020. This is the only study that look into the Turkish IT Distributors inventory management and the profitability relationship only. Other available studies included the whole Information Sector companies in their studies, but this study directly investigates the Turkish Information Technologies Distributors via four biggest players from the sector with having listed in the BIST. That is why this study is differs from the other studies in the literature. Other studies in the literature mostly found that inventory management and the profitability are in a positive relationship (Ayturk and Yanik ,2015), (Mohammad, 2015), (Sekeroglu, 2014), (Bahcivanoglu, 2019). Some of the studies found negative relationship, (Saglam and Kagıtcı, 2016), (Deloof, 2003), (Shin & Soenen, 1998) and (Lazaridis & Tryfonidis, 2006).

## **CHAPTER 5**

### **5. CONCLUSION**

In this study the relationship between inventory management and the profitability investigated via four Turkish Information Technologies Distributors which are listed in Istanbul Stock Exchange XBLSM Index for a period of 2010-2020. Quarterly financial reports used in the analysis and the data gathered from PDP.

Inventory management chosen as independent variable and the measurement variables are as follows; Change in Inventory Turnover Days, Change in Accounts Receivables Turnover Days, Change in Sales and Change in Inventory. After selecting the variables, all the data gathered from PDP for four company for a period of 2010-2020. Quarterly financial reports were collected for all years, and the necessary variables are entered into Excel program which the total number of 2816 data. After collecting the necessary data's calculations has been done for the variables. Furthermore, the change in the variables calculated. Lastly the average of these data collected for every quarter and correlation and regression analysis completed with these data which in total of 220.

According to the correlation analysis there is a statistically meaningful relationship found between the inventory management and the profitability for four IT distributors in BIST. Results shows that there is a positive relationship between the change in gross profit margin and change in account receivables turnover days. For change in sales and change in stock it has been found negative relationship between the change in gross profit margin. For change in inventory turnover days and change in gross profit margin it has been found that there is no statistically meaningful relationship can be found.

In regression analyses it has been found that there is no statistically meaningful relationship found between inventory management and the profitability for the analyzed model. This result was not expected result at the beginning of the study but it is found out afterwards it is concluded that Turkish IT Distributors way of doing business is affecting the data's that are used in the analyses. First reason is the discount on early payment and the long term of maturity given to the customers creates an increase in the financial costs and mislead the data used in this analysis. Second reason is the volume business affects the gross profit margin because the cost of goods sold is higher due to purchase of contractual price and the claiming process of the distributors affecting the financial tables. Third reason is the late collection of the claim money from the manufacturers and the possible errors in the claiming process. Due to the high purchase price and lower sales price, there must a claiming process must be managed by the distributor. If there is an error made in this transaction, distributor may face a loss. Another problem is the average collection of this claim money is 60 days. This long collection period increases the financial costs of the distributors. Also, almost all the transactions are dealt with USD currency and the fluctuations of the currency also effecting the distributors. If the companies decrease the maturity days in their sales activities, they might be increase to their profitability's. Fourth reason is again related to misleading the financial data's because in each year and for each company the highest sales revenue generated in Q4 but the previous and the next quarter sales revenue is always very low then the Q4. Also, while the sales revenue is increasing in the years of the analysis, profitability of the companies not increasing parallel to the sales revenue. This is also misleading the data and effects the data distribution on the analysis. Last reason is the Value business directly affecting all variables in the analysis. Because a million-dollar project will change the financial tables and most of the time these projects directly shipped to the customers without holding in inventory. These activities affecting the Change in Inventory Turnover Rate, Change in Sales, and other variables. Unfortunately, there is no data available for separating the volume and the values business data and this study must cover both sale activities. As there is no distinction between the value and volume business in financial statements this study cannot exclude the value business effects in the study. Because of these 5 reasons this study did not show any statistically significant relationship between the inventory management and the inventory.

This study is differing from the other studies in the literature by focusing only inventory management and the profitability of the Turkish Information Technologies Distributors which are listed in Borsa Istanbul Stock Exchange XBLSM Index. Also focusing only, the Distributors in the sector for a 2010-2020 period with the selected variables and the results makes this study different than the literature.

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## **CURRICULUM VITAE**

