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**WORKING CAPITAL MANAGEMENT, OPERATIONAL EFFICIENCY AND
FIRM PERFORMANCE: A COMPARATIVE ANALYSIS on MANUFACTURING
and SERVICE COMPANIES**

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ÖZET

İŞLETME SERMAYESİ YÖNETİMİ, OPERASYONEL VERİMLİLİK ve ŞİRKET PERFORMANSI: İMALAT VE HİZMET ŞİRKETLERİ ÜZERİNE BİR KARŞILAŞTIRMALI ANALİZ

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20. yüzyılda ortaya çıkan finansal krizler, kurumsal kaynakların önemini, ve özellikle de firmaların operasyonel verimliliği ile doğrudan bağlantılı olan İşletme Sermayesi Yönetimi'nin ("İSY") önemini, sermaye piyasalarının ön planına çıkarmıştır. Bu araştırma tezinde, operasyonel verimliliğin, hem operasyonel verimlilik hem de WCM'nin oldukça kapsamlı bir ölçütü olan Nakit Dönüşüm Döngüsü ("NDD") açısından, firma performansı üzerindeki etkileri, panel verileri kullanılmak suretiyle, incelenmiş ve değerlendirilmiştir. Buna ilaveten, Stok Devir Süresi, Borç Ödeme Süresi, Alacak Tahsil Süresi olarak adlandırılan CCC alt parametrelerinin firma performansı üzerindeki etkileri de bu tezin bir parçası olarak incelenmiş ve değerlendirilmiştir. Çalışmanın sonucunda, CCC'nin, operasyonel kar, faaliyet nakit akışı, faiz ve vergilerden önce kazanç şeklindeki üç ölçütün tümü üzerinde anlamlı bir negatif etkiye sahip olduğu; oysa firma büyüklüğünün yukarıda sayılı tüm performans ölçütleri üzerinde pozitif ve anlamlı bir etkiye sahip olduğu bulunmuştur. In addition to that, impacts of DIO, DPO, DSO on firm performance are also reviewed and evaluated as part of this thesis.

Anahtar Kelimeler: İşletme Sermayesi Yönetimi, Operasyonel Verimlilik, Kârlılık, Nakit Dönüşüm Döngüsü, İmalat Sektörü, Hizmet Sektörü.

ABSTRACT

WORKING CAPITAL MANAGEMENT, OPERATIONAL EFFICIENCY AND FIRM PERFORMANCE: A COMPARATIVE ANALYSIS on MANUFACTURING and SERVICE COMPANIES

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The financial crises that emerged in the 20th century have brought the importance of organizational resources, and particularly the importance of Working Capital Management (“WCM”) which carries a direct connection with firms’ operational efficiency, to the forefront of capital markets. In this research thesis, the impacts of the operational efficiency, in terms of Cash Conversion Cycle (“CCC”) which is a highly comprehensive measure of both operational efficiency and WCM, on firm performance are reviewed and evaluated by using the panel data. In addition to that, impacts of sub-parameters of CCC, namely Days of Inventory Outstanding, Days of Payables Outstanding, Days of Sales Outstanding, on firm performance are also reviewed and evaluated as part of this thesis. As a result of the study, it has been found that the CCC has a significant negative impact on all of the three measures, i.e. operational profit, operating cash flow, earning before interests and taxes; whereas, size of a firm has a positive and significant impact on all of the abovementioned performance measures.

Keywords: Working capital management, operational efficiency, profitability, cash conversion cycle, manufacturing sector, service sector.

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LIST of ABBREVIATIONS

A/P	: Accounts Payable
A/R	: Accounts Receivable
A/T	: Asset Turnover
BIST	: Borsa Istanbul Stock Exchange Market
BSE	: Bombay Stock Exchange
CA	: Current Assets
CCC	: Cash Conversion Cycle
CL	: Current Liabilities
COGS	: Cost of Goods Sold
CR	: Current Ratio
D	: Day
DIO	: Days of Inventory Outstanding
DPO	: Days of Payables Outstanding
DSO	: Days of Sales Outstanding
EBIT	: Earnings Before Interest and Taxes
FMCG	: Fast Moving Consumer Goods
GDP	: Gross Domestic Product
GMM	: Generalized Method of Moment
OPEC	: Organization of Petroleum Exporting Countries
KAP	: Kamu Aydınlatma Platformu – Public Disclosure Platform
KSE	: Karachi Stock Exchange
LLC	: Levin, Lin and Chu (2002) Test
LM	: Lagrange Multiplier
LTL	: Long Term Liabilities
NASDAQ	: National Association of Securities Dealers Automated Quotations
NPV	: Net Present Value

NWC	: Net Working Capital
OLS	: Ordinary Least Squares
OMX	: Offset Market Exchange
QFR	: Quarterly Financial Report
ROA	: Return on Assets
SET	: Science, Engineering and Technology
SME	: Small and Medium Enterprise
STL	: Short Term Liabilities
TA	: Total Assets
UK	: United Kingdom
US	: United States
USA	: United States of America
VIF	: Variance Inflation Factor
WCM	: Working Capital Management

INTRODUCTION

The economic and financial crisis occurred at the late 20th century such as the OPEC Oil Price Shock (1973), the Asian Crisis (1997) and collapses of giant organizations, such as General Motors, Lehman Brothers, Bear Stearns etc., brought the importance of organizational resources to the forefront of capital markets and particularly the importance of Working Capital Management (“WCM”) which carries a direct connection with the firm’s operational efficiency. The WCM can be regarded as a crucial factor which has a direct impact on the operational efficiency of a firm through its effect on generating cash and managing daily operations in an efficient way.

Working capital is described as the capital available to meet the day-to-day operations (Cooper, et al. 1998). The volume of the working capital varies from an industry to other. Indeed, an optimum utilization of a firm’s resources has vital impact on level of its operational efficiency. In addition to that, a proper WCM provides an opportunity to extract cash from firm’s operations, instead of raising debt externally.

As explained by Chakraborty (2008), the inadequate working capital may lead the firm to bankruptcy. On the other hand, excessive working capital results in wasting cash and ultimately in a decrease in profitability. Pedro and Pedro (2007) pointed out that WCM impacts a firm’s profitability. They stated that while investments in current assets are considered, one should be careful on the level of such investments due to the fact that excessive investments in current assets can be harmful to a firm’s profitability. Hence, it is important for each firm to determine the effects of the amount and the period to be tied in current assets which in turn will bring the question of how to finance them and thus will impact how much current liability to maintain. In this respect, the appropriate levels of days of sales outstanding (DSO), days of inventory outstanding (DIO) and days of payable outstanding (DPO) should also be determined which hold explicit linkages with a firm’s main operations and thus impact the operational efficiency and the performance of the firm.

As explained by Finnerty, (1993) and Jose et al., (1996), liquidity, as a ratio of current assets and current liabilities, is an important equation to explain firm's ability of generating cash for its needs. However, such liquidity measures such as the current, acid-test, and cash ratios which are common measures of liquidity, are short-coming and constitute static measures that cannot provide detailed, accurate and dynamic information about the effectiveness of WCM.

As it is related to WCM, the executives should find effective and efficient ways to deal with the sources available for the day-to-day operations in order to achieve the optimum impact where an efficient WCM leads to increased cash flows, and thus leads to lower need on external financing; therefore, the probability of default for the firm is reduced and here a key factor in the WCM is the cash conversion cycle (Deloof, 2003) which, through combining the measures related with the core operations of a company, provides a highly comprehensive measure of both operational and WCM efficiency.

Hager (1976), Richards and Laughlin (1980), Emery (1984a), Kamath (1989), Gentry et al. (1990), Schilling (1996) and Boer (1999) have used ongoing liquidity measures in WCM. Ongoing liquidity refers to the inflow and outflow of the cash as purchasing, manufacturing, sales and receivable collection takes place over time. In relation with that, Pinches, (1992) describes the firm's ongoing liquidity as a function of its Cash Conversion Cycle.

WCM is impacted mainly through Cash Conversion Cycle ("CCC") which is the most important step of an efficient WCM. CCC can serve as one of several quantitative measures which help to evaluate the efficiency of a company's operations and management. The CCC is a good performance measure for observing up-stream and down-stream parties in order to avoid higher commercial risks. Furthermore, as it might vary depending on a firm's features and its sector, optimum level of the CCC shall be defined for each firm. A higher level of CCC may lead the firm to seek more finance and pay higher cost of finance during its operations, whereas a shorter CCC might reflect the optimum use of inventory and quick turnover. According to (Apak and Demirel, 2010: 252), a shorter DSO of a firm will result in an increase in the amount of its cash and reduce the additional amount of cash needed. At the same time, a decrease in DIO may lead the firm to reduce its inventory financing position, which might also support the firm to reduce its need of cash where that

might also support the firm to provide a shorter DPO period to its suppliers, which possibly can lead the firm to purchase with a lower cost. That shows how CCC is combines the three parameters: Days of Inventory Outstanding (DIO), Days of Payables Outstanding (DPO) and Days of Sales Outstanding (DSO).

Through the CCC, companies are able to negotiate payment terms, trade credits and the optimal inventory they should have to fulfil where this obviously impacts liquidity and more than that, profitability in terms of individual ratios and general results per industry (Da Costa 2014).

To observe how working capital management can affect profitability, we need to take a look at a company's cash flows. As Shin & Soenen (1998) state in their study, a longer cash conversion cycle might indicate that a company's sales are rising and that the company can compete by having uncertain credit policies or high inventories. But on the contrary, a higher cash conversion cycle can actually hurt a company's profitability by increasing the time that cash is tied to non-interest bearing accounts such accounts receivable. By shortening the cash conversion cycle, the company's cash flows will have a higher net present value (NPV) because cash is received quicker.

The main purpose of this study is to investigate impact of the operational efficiency in terms of CCC which is a highly comprehensive measure of both operational efficiency and WCM as well as in terms of its sub-parameters (DIO, DPO, DSO) on firm performance for the major firms that are publically quoted on the BIST (Borsa Istanbul, the stock exchange market in Istanbul) by using their quarterly based financial data for the period of Q1 2009 – Q3 2019. Furthermore, through focusing on manufacturing and service industries separately, any potential differences that may prevail among those two industries will also be investigated.

To accomplish this objective, the paper is divided into 4 main chapters. The first chapter of the paper defines the Working Capital Management, Operational Efficiency, cash conversion cycle and their related sub-definitions, while the second chapter provides the Literature Review, the third section presents the Methodology and the fourth described as the Empirical Results and Discussions of this study. Finally, conclusion, references and other annexes are provided.

CHAPTER I

WORKING CAPITAL MANAGEMENT AND OPERATIONAL EFFICIENCY

1.1 FIRM OPERATIONS AND WORKING CAPITAL MANAGEMENT

In order to maintain sustainability of their operations, firms are trying to achieve their targeted level of production of goods and services, and then selling them, where they are always in need of supply of raw materials and outsourced services to meet their production level. Within the available market conditions, in order not to interrupt the production and continue in receiving payments from their sales, firms are in need of maintaining adequate inventory levels of goods and services. As long as production, sales and receiving cash from the sales are not realized at the same time, the working capital is needed (Boyacıoğlu, 2012).

The basic definition of the Working Capital is the capital available, or needed, to fulfil daily operations of a firm. According to Garcia PJ & Martinez P, (2007), working capital is the total value invested in current assets of a firm. As a definition of volume and composition of sources, the WCM should be utilized to increase the wealth of shareholders through increasing the firm value. Thus, WCM refers to the management of current assets and current liabilities in such a way which might result in the most desirable level of working capital that will maximize profitability. As explained by Chakraborty, (2008), the inadequate working capital leads the firm to bankruptcy.

Working capital management supports the firm to manage its operations and fulfil its various obligations. At the same time, it reduces liquidity risks, supporting sustainability of manufacturing and other operations, enhancing credibility and business potential of the firm (Arslan, 2003). through increasing efficiency levels and thus profitability. Firms will have a dual interest during examination of financial performance such that, to assess the efficiency and profitability of operations and to query how efficiently the resources are being used (Helfert, E.A. 2001).

Nowadays, firms are operating under extreme competition conditions in both domestic and global markets, which constraints the number of variables that may lead to a competitive advantage. For that reason, the efficient working capital management is a very important tool that may help the firm to improve its competitive advantage which might translate in to a higher revenue and adjusted enterprise value.

1.2. FEATURES OF WORKING CAPITAL MANAGEMENT

Main characteristics of the WCM are basically;

- Short term needs,
- Circular movement,
- An element of permanency,
- An element of fluctuation, and
- Liquidity.

1.2.1. Short Term Needs

The Working Capital is a concept referring to the assets that are expected to be converted into cash within one year of financial period. That conversion starts with cash, at the time of paying for the purchases and ends when the cash from the sales is received. As it depends on the length of the manufacturing period, receivable collection and payable periods, the specified cycle may take place several times during a year.

1.2.2. Circular Movement

As it might be observed several times during a year, the working capital might constantly turn into cash. Moreover, a continuous interaction is observed between elements of the working capital, since manufacturing, sales operations and inventory keeping of the firms will be maintained.

1.2.3. An Element of Permanency

During their lifetime, firms will always purchase, manufacture and sell to maintain their operations. As we stated previously, all these activities cannot be realised at the same

time. Hence, so long as operation continue, the firm will remain in need of the working capital.

1.2.4. An Element of Fluctuation

Although the need of working capital is felt permanently, the needed volume of WCM fluctuates more widely than that of fixed capital. The required volume of working capital varies directly with the level of production. It also varies with the variations in the purchase and sale policies, price levels and the demand conditions.

1.2.5. Liquidity

If needed, the working capital can be converted into cash within a short period and without a significant loss. That characteristic provides a strong tool for a firm's executives to act in case of an extensive increase in the working capital is observed.

1.3. TYPES OF WORKING CAPITAL

Fields of activity of the firms might differ from one to the other. Firms might spend different amounts as per needs of their fields of activity. Even the firms that operate in the same field might have different levels of expenses. Therefore, a certain amount of fund that would fulfil the needs of Firm A, might not be enough for the needs of Firm B. Furthermore, the funds that presently fulfil the needs of Firm A may become insufficient to cover the needs in the future (Aksoy, A., 1993). Therefore, it will be more appropriate to determine the working capital through various types and concepts.

1.3.1. Gross Working Capital

The Gross Working Capital is defined as the total amount of the assets that might be turned into cash within one fiscal year, which includes liquid assets such as cash, inventory, short-term investments and accounts receivable.

1.3.2. Net Working Capital

The Net Working Capital (NWC) refers to the difference of total assets and total liabilities ($CA = TA - CL$). Since it is defining the condition of where the current assets exceed

the short term liabilities, the NWC express an important insight about the firm's commercial standing and security margin in relation with its receivables and short term operations (Hiçşmaz, M., 1977).

According to Akdoğan, N. and Tenker, N., (1988), areas of using the NWC might include the funding of losses, purchasing of fixed assets, tax payments etc.

1.3.3. Permanent Working Capital

The Permanent Working Capital refers to the lowest amount of investment which is always needed by the firm in order to realize its operations with no interruption.

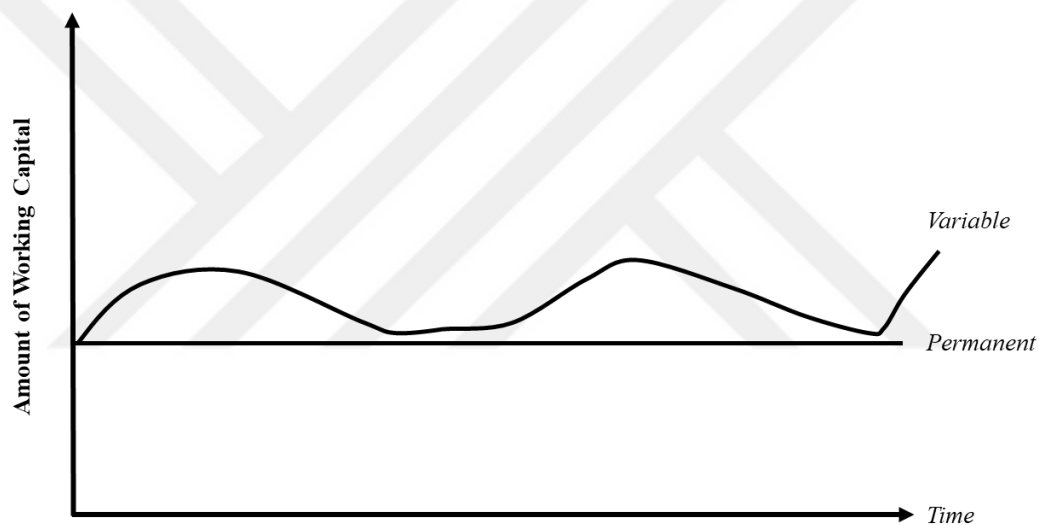


Figure 1. Illustration of permanent and variable working capital (size of the firm is considered constant for the time period).

1.3.4. Variable Working Capital

It is the type of working capital where the needed amount of capital varies due to seasonal or periodical effects in the operations. According to Aksoy and Yalçiner, (2008), since it is needed for temporarily and for certain periods, variable working capital might be preferred to be financed with the short term liabilities.

1.4. FACTORS THAT IMPACT WORKING CAPITAL

Büyükşalvarcı, A. and Abdioğlu, H., 2010, pointed out that the firms with an efficient working capital management continues their operation with success and keep a sustainable profit margin. In addition to that, an efficiently managed working capital will help the firm to control its performance and overcome the risk of a short term crisis which may include changes in raw material prices.

Therefore, one of the most important duties of executives of the firms is to define the best fitting working capital structure. In order to achieve the best fitting working capital structure, they should examine and understand the widespread factors that might affect their companies' working capital level.

There are wide range of factors that might affect the working capital level. Some of those are; nature of business, production time, terms of purchase and sales, risk and timing.

1.4.1. The Nature of Business

Fields of activity of the firms might differ from one to the other. Since each firm has its own operating nature, working capital requirements will differ among firms. For instance; manufacturing companies are keeping inventory and in order not to interrupt their operation, therefore they should secure the level of inventory at a certain amount whereas service firms generally either don't hold inventory or carry only a very limited amount of inventory.

1.4.2. Production Time

In accordance with a firm's activities and expectations of its customers, each firm has its own manufacturing plan, where they need to spend for raw materials, labour and utilities etc. In case of the firm has a longer time of manufacturing, it will need a higher working capital to sustain its manufacturing level, whereas less working capital will be needed in a faster manufacturing process.

1.4.3. Terms of Purchase and Sales

Following an open-handed credit strategy for customers will result in a need of higher value of working capital. In addition to that, according to Nobanee and AlHajjar (2009), reducing the average of payment collection period may cause the loss of good credit

customers while lengthening the average payback period may damage the firm's credit reputation and harm its profitability in the long run.

1.4.4. Risk

As defined by Albayrak, A.S. and Akbulut, R., (2008), in their study regarding capital structure, firms are always in need of sourcing fund during executing their activities. While choosing the source of funding, risk is a highly important factor. Use of long term liabilities (LTL) and owner's equity will reduce the liquidity risk of the firm and increase its cash levels. The LTL is accepted less risky than the short term liabilities (STL) due to its longer maturity periods with fixed interest rate.

The STL is considered more risky, since maturity of the STL is shorter and the interest rate is changeable. As short-term debts will be re-financed periodically, the possible impact of short-term economic developments may result in a change in level of the interest rates and in the credibility levels of the firms. Therefore, executives must keep the risk and profitability at optimum balance while choosing a source.

1.4.5. Timing

Timing is described as a function of the availability of the necessary conditions at the time when the cash is needed (Akgüç, Ö., (1998). Therefore, finance executives shall follow financial markets very closely. For example, when the conditions of financial markets are promising to rise low cost funding, converting the short term liability into long term liabilities will help to strength the working capital. Executives of the firms shall manage the timing of these borrowings or issuing of shares properly. In addition to that, while share value is low in the market, it might not be a good choice to issue new shares since it can push the price down further. In that case issuance of bonds might be a better option.

In addition to the above factors, growth of a business and turnover of circulating capital might also affect the working capital. During expansion period of a firm, it is reasonable to expect an increase in level of its working capital.

1.5. WORKING CAPITAL MANAGEMENT POLICIES

Requirement of working capital depends on the type of the sector that the firm operates and its implemented working capital policy. One of the main concerns of the working capital investment decision is the determination of the volume of firm's resources that should be invested in working capital. In addition to that, level of working capital of a firm or a sector might be considered as low or high for another. Since every firm has different operations or business characteristics, the level of the working capital might differ across industries. The level of required working capital is also likely to change over time in response to the features of the firm's operation (Collins et al, 1996).

Pandey (1993), pointed out three distinct types of working capital policies which a firm can implement; aggressive policy, moderate policy and conservative policy. Aggressive and conservative policies reflect the exact opposite situation in terms of the working capital policy option. As the main reflections of the conservative policy, increase in level of investment in current assets can be observed. In addition to that, investing in current assets through long term capital is also presents characteristics of the conservative policy. Conversely, the aggressive working capital policy presents lower level of investment in current assets and the less tendency of firm's regarding investing through long term capital to finance current assets.

1.5.1. Conservative Working Capital Policy

That policy implies relatively greater investment in current assets in relation to sales where the current assets to sales ratio will comparatively be high and asset turn over ratios will be low, and additionally, in a conservative approach, inventory and level of cash reserves generally be kept high to avoid inventory and liquidity cost where the firm with a conservative working capital policy is also likely to hold a sizeable investment in short-term bank deposits and other short term investments (Copeland, et al, 2005).

Investing in current asset might be categorized into two types, such as: permanent current assets and temporary current assets where investing in permanent current assets represents the minimum level of investment in current assets that needed continuously, and in addition to that, the firm shall invest in temporary assets, to manage potential fluctuations in needs of its business (Brealey & Myers, 1996).

1.5.2. Aggressive Working Capital Policy

That policy relies on the lowest level of investment in current assets and is highly dependent on access to short-term financing where the current asset to sales ratio is much higher and the current turnover rates will also be much higher in comparison to a conservative policy and in terms of financing, McMenam (1999) says that a company following an aggressive working capital policy uses long-term finance to fund its investment in permanent fixed assets and also a substantial part of its permanent current assets where short term financing is used to fund not only the temporary current assets needs but also some part of the permanent current asset requirements as well.

1.5.3. Moderate Working Capital Policy

With a moderate working capital policy, the level of investment in current assets is neither weak nor excessive. Following a moderate policy, long-term funds are used to finance the investment in fixed asset and permanent components of current assets investments while temporary or seasonal current assets are financed by short term sources of finance McMenam (1999).

1.6. MAIN COMPONENTS OF WORKING CAPITAL MANAGEMENT

For every firm, it is important to understand the change within its working capital. Analysing status of the working capital might provide a guidance to understand the current level and the potential change in working capital during the financial year. The firms that hold sufficient working capital are considered as financially strong firms and thus will have relatively easier access to financing. Apart of that, working capital is very important due to the factors of flexibility and liquidity. However, the level of working capital may negatively impact a firm's profitability as well. In the meanwhile, a smaller level of working capital will carry risk of failing to fulfil its liabilities on the schedule since it takes time to convert low liquid assets into cash at their fair value. Of course it is an option to sell them at a lower price which will then result in a loss. In order to avoid such risks, management of the working capital shall be made carefully and systematically (Hatiboğlu, Z., 1986).

In order to have an efficiently managed working capital, the firm shall focus on cash management, inventory management, accounts receivable management and debt management.

1.6.1. Cash Management

The aim of cash management is to establish and reach the suitable level and structure of cash and marketable securities, consistent with the nature of the business's operations and objectives (Brigham, et al. 1999, Gitman, 1997, Schilling, 1996, Scherr, 1989, Cheatham, 1989). Cash should be managed so as to achieve the optimum level, without carrying extreme risk or holding excessive amount of cash. In order to reach and maintain this optimum level, both the motive and the suitable level of cash needs to be established and monitored (Brigham, et al. 1999, Gitman, 1997, Phillips, 1997, Chambers and Lacey, 1994, Brigham and Gapenski, 1994, Moss and Stine, 1993, Miller, 1991, Scherr, 1989, Cheatham, 1989, Richards and Laughlin, 1980).

In order to generate profit, firms need a good financial management and efficient financial strategies. That financial strategy shall generate policies and create value that will satisfy its shareholders and investors' expectations where the policies must also identify the type of the needed assets and how these assets shall be utilized. When a firm keeps an amount of cash, the effect of that amount to its profitability might be positive or negative. Therefore, a good established cash management strategy, can have a great contribution to increase firm's profitability (Yılmaz, 2004: 11).

The cash budget ratio is an approach sets a performance target in terms of the ratio of cash to the number of days' worth of payables or, the ratio of cash as a percentage of sales where these target ratios are compared with the industry average and this approach is subject to the well documented limitations of ratio analysis (Gallinger and Healey, 1987).

As studied by Gitman, (1997), and Gallinger and Healey, (1987), Cash budgeting focuses on the management of cash flows and balances where this approach is based on the assumption that both the magnitude and the timing of cash receipts and disbursements are known with a high degree of accuracy which might be explained by means of sensitivity and

scenario analysis, accuracy in the magnitude and timing of the cash flows can be factored into the analysis.

(Barney, 1991) has pointed out *cash forecasting* as an estimate and projection of the business's cash needs on a daily, weekly, monthly, and annual basis by considering factors such as sales, fixed assets, inventory requirements, times when payments are made, and collections are received where the cash forecast can be combined with the daily, weekly and monthly actual bank balances. The forms part of the business's cash control system and cash budget enabling firms to plan for unexpected surpluses or deficits (Scherr, 1989).

1.6.2. Accounts Receivable Management

As a result of selling goods with a deferred payment terms, the level of accounts receivable (A/R) of the firms will increase. Depending on the agreed sales conditions, the firms might receive its cash in years, months or weeks. In order not to be affected by that credit periods, the firm should carefully manage its A/R by credit management. As it has been examined by Brealey, R., et.al., (2006), managing the A/R by credit means that decisions regarding terms of sale, credit analysis and decision as well as the collection policy have to be made, such as; improving the efficiency of collection, the company can sign significant advantages in working capital whereas a too aggressive policy can affect the company's sales, and can create a conflict between sales and collection.

1.6.3. Inventory Management

Inventory is another important current asset which is depending on the industry a company's activeness in inventories may consist of different things; e.g. raw materials, works in progress or finished goods where managing and optimizing inventory levels are challenging tasks which require balancing between sales and tied-up capital, by means, in case that the inventory levels are too low, the company might miss out on sales when demand arises or might not be able to deliver goods on time, on the other hand, too much inventory ties up capital that can be used elsewhere more efficiently, where the trend has been to lower inventory levels over the past decades (Brealey, R., et.al., (2006). A concept that is often used for inventory management is just-in-time approach which means that inventories are

kept to a bare minimum and optimizing the supply chain process to serve so that in inventories never exhaust (Brealey, R., et.al., (2006).

1.6.4. Debt Management

In order to manage their operations, firms might obtain debt from external sources. All of its processes must be managed starting from the date of the debt is collected until the date of refund of the total amount. Moreover, short term external sources are used for the daily needs of financing. Short term external resources have impacts on the employment rate, purchasing raw material with suitable cost, holding the necessary inventory levels and ultimately on the firm's profitability. However, in order not to face any cash shortages, while selecting a short term external source, operational cycle and cash cycle shall be followed carefully (Aksoy and Yalçiner, 2008).

1.7. WORKING CAPITAL MANAGEMENT AND OPERATIONAL EFFICIENCY

The efficient management of working capital is a fundamental part of the overall corporate strategy to create shareholder value (Nazir and Afza, 2009). Therefore, firms try to keep an optimal level of working capital that maximizes their value (Deloof, 2003). The main objective of working capital management is to reach an optimal balance between WCM components (Gill, 2011).

An effective working capital management requires removing risks that might come up while the enterprise tries to perform short-term responsibilities, planning and controlling temporary investments and liabilities well in order to prevent over investment on temporary investment components (Eljelly, 2004).

Efficiency of WCM is traditionally based on the principle of speeding up collections and inventory turnover, and slowing down disbursements however, reducing the average collection and reducing days in inventory periods may cause the loss of good credit customers, and increase the storage cost, respectively while lengthening the average payback period may damage the firm's credit reputation and harm its profitability in the long run (Nobanee and AlHajjar, 2009).

Raheman and Nasr (2007) indicate that large inventory and generous trade credit policy may lead to high sales which will also reduce the risk of shortages in stocks.

Additionally, they state that delaying payment of accounts payable to suppliers allows firms to access the quality of obtaining products and can be an inexpensive and flexible source of financing. On the other hand, delaying of such payables can be expensive if a firm is offered a discount for the early payment. Regarding collection of receivables, they mentioned that a longer days of sales outstanding can lead the firm to face with cash inflow problems.

“The working capital plays the same role in the business as the role of heart in human body. Working capital funds are generated and these funds are circulated in the business. As and when this circulation stops, the business becomes lifeless. It is because of this reason that the working capital is known as the circulating capital as it circulates in the business just like blood in the human body.” (Agarwal, 2000).

As stated previously, appropriate levels of the working capital might be different for each firm depending on its sector, manufacturing policy, size, marketing policy etc. However, each firm shall have an adequate level of working capital in order to maintain its operation without facing capital problems.

Some advantages of having an adequate level working capital are listed in below (Erdoğan, M. (1990, p-76));

- *“To support the firms to operate with full capacity and economically in accordance to its activities,*
- *To have a greater backlog*
- *To maximize firm’s capability of fulfilling the liabilities on time.*
- *To increase its credibility against the creditor.*
- *Not to be effected during up-normal market conditions*
- *To continue its operations with profitable and efficient conditions.*
- *To continue on manufacturing without any disruption and or interruption.”*

Firm’s working capital might be inadequate as result of an up-normal market conditions or inappropriate finance management. In case of that inadequacy has not been overcome quickly, operational efficiency of the firm will decrease and the firm will face difficulties in terms of its financial conditions (Güvemli, O., (1973).

Some of main reasons behind an inadequate level of working capital are listed below (Aydın, N. et.al. (2008);

- *“Dividend distributions in cash,*
- *Extremely increasing the cost and/or damages that might be faced in firm’s operations,*

- *Expansion of the operations,*
- *Not calculating an adequate profit margin on the sales price,*
- *Lack of receivable management,*
- *Increases in cost of inputs,*
- *Decreases in the amounts of equity,*
- *High interest rates on borrowing.”*

Unnecessarily high working capital will increase the liquidity and decrease the capital turnover. Moreover, under that circumstance the firm will have idle assets which might lead to a decrease in firm's profitability. In order to reduce the volume of idle assets, the firm might invest in marketable securities or consider buying back its own shares (Aksoy, A., 1993).

Factors that cause excessive working capital can be summarized as below (Erdoğan, M. 1990);

- Spending of the profit generated from operating activities and company earnings in fixed assets or similar investments instead of making dividend payments,
- Issuing of excessive amounts of bonds and shares,
- Collecting receivables aggressively,
- Selling of tangible assets without buying new ones,
- Having more equity than the amount necessary to purchase fixed assets or incurring long-term borrowings,
- Failing to purchase new tangible assets with accumulated depreciations, although the depreciation periods of tangible assets are completed.

1.8. RATIOS OF WORKING CAPITAL ANALYSIS

Ratios, are the most commonly used measures to analyse the level of working capital. Where balancing the liquidity, risk and profitability is a key element of the working capital management, calculating of these ratios and evaluating their levels are needed. In addition to that, quantifying these ratios will also help firms in taking financial decisions in relation with the employee performance, operational efficiency etc. (Khajeh, S.G., (2014)).

However, mentioned traditional ratios are also not meaningful in terms of cash flows (Richards and Laughlin, 1980).

Providing the needed financial sources, allocating that sources for investments into the current and fixed assets and proper distribution of the dividends are some of the duties of the finance executives. In order to take the proper decision, finance executives shall make the financial analysis properly. However, even it provides a healthy mathematical results, in some cases the financial analysis may not be enough to take decision (Öztanır, İ., (2015)). In that case, the finance executives will be in need of additional information. which will help them to achieve much proper results in their operations.

1.8.1 Liquidity Ratios

These type of ratios are analysed through the amounts of current assets and current liabilities. Simply, its calculated to quantify the short-term solvency of the company in terms of its ability to meet its short term liabilities.

1.8.1.1. Current Ratio

Current ratio is simply calculated by dividing the current assets to the current liabilities. This ratio explains the capability of a firm to pay-back its short term debts. A high level of current ratio means that the firm has a strong power of paying its debts (Ercan, M.K. and Ban, U., 2009). Current assets consist cash and cash equivalents, investments in marketable securities, trade receivables, inventories etc. Whereas, the current liabilities include short-term borrowings, trade payables etc.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

If;

Current Ratio >2 = Firm's Current Assets level is more than its need.

Current Ratio <2 = Firm's capability of paying its short term loan is low.

Current Ratio = 1 = Firm's Net Working Capital is zero.

Current Ratio <1 = Firm's Net Working Capital is negative.

Current Ratio >1 = Firm's Net Working Capital is positive.

The adequacy of working capital is widely evaluated through the current ratio which is highly preferred by the creditors since it determines the capability of the firm in terms of

fulfilling its short term liabilities. Creditors prefer to observe higher levels of this ratio while the firms are focussing on balancing it (Akgüç, Ö., 1998).

According to Bolak, M., (1998), developed countries are considering a current ratio of 2 is sufficient for their firms. However, in developing countries, the current ratio is accepted as sufficient with a level of 1,5. It is clear that we shouldn't accept that statement as it is. That ratio might be different for various sectors. On the other hand, a high value of the current ratio means there is an idle source within the firm. That idle source might be a strong insight of an insufficient management of the firm. Because, keeping an excessive amount of cash within a firm will negatively impact the profitability of the firm (Ceylan, A., 2006).

In sum, the working capital of the firm is considered adequate in case of its current ratio is calculated around 1.5-2. However, a high level of current ratio doesn't always mean that the working capital is adequate. The current ratio of a firm might be calculated at high levels, due to its outstanding accounts receivables or high level of inventory. Therefore, it might not be accurate to consider that the cash ratio will lead to a precise result. As conclusion, it is not possible to take an absolute decision about the financial conditions of a firm by only analysing the CR.

1.8.1.2. Quick Ratio (or Acid-Test Ratio)

That ratio presents the capability of a firm to fulfil its short term with its highly liquid current assets (Brigham, E. and Houston, J., 2014).

$$Quick Ratio = \frac{(Current Assets - Inventory)}{Current Liabilities}$$

The result of above formula is expected to be 1. That means, firms are expected to overcome their total amount of current liabilities by utilizing only their highly liquid current assets such as; cash, cash equivalent, marketable securities and receivables.

Receiving a small or big value from that equation may not be enough to tell us whether the firm has a strong liquidity or not. Therefore, after receiving the result of that equation, days of receivable outstanding, inventory turnover and inventory dependency should also be considered (Tükenmez, M., et.al.,1999:387).

1.8.1.3. Cash Ratio

Since it shows the cash available within the firm to fulfil its short term liabilities, its accepted as the most trustable liquidity ratio of a firm (Tükenmez, M., et.al., 1999).

$$\text{Cash Ratio} = \frac{(\text{Cash} + \text{Cash Equivalent})}{\text{Current Liabilities}}$$

The cash ratio is expected to be 20 %. If that ratio drops below 20 %, that means the firm has cash shortages. Whereas, if it exceeds the level of 20 %, that means there is an idle amount of cash within the firm (Tükenmez, et. al.,1999:390).

1.8.2. Operational Efficiency Analysis Ratios

That ratios explain the efficiency of its assets and thus help to evaluate whether the they have been utilized efficiently or not. In the meanwhile, they explain the approximate period of the conversion of the assets into cash (Arat M. E. and Çetin, A., 2011).

1.8.2.1. Account Receivable Turnover

That ratio is used to determine the speed of a firm to collect its cash from the sales. In the meantime, it answers the question of; how many times it collects its cash from sales in a year? A greater turnover means that the firm is collecting its cash efficiently (Erol C., 1999).

$$\text{Account Receivable Turnover} = \frac{\text{Net Sales}}{\text{Average Account Receivable}}$$

1.8.2.2. Inventory Turnover Ratio

It is a turnover that shows the efficiency of the inventory which explains the total times of inventory sales in a financial year. This ratio is calculated by dividing the cost of goods sold (COGS) to the inventory. The inventory is calculated as the average of the beginning of the period and the ending of the period.

$$\text{Inventory Turnover Ratio} = \frac{\text{COGS}}{\text{Inventory}}$$

A greater inventory turnover ratio indicates a high level of inventory efficiency. That means, a higher inventory turnover ratio leads to a decrease in the need of working capital (Akdoğan, N. and Tenker, N., 1988).

1.8.2.3. Accounts Payable Ratio

It describes a firm's capability of paying its trade payables. It is calculated by dividing the COGS to the average of the beginning and ending trade receivables. The ratio shows that how many times a firm is paying for its payables

$$\text{Accounts Payable Ratio} = \frac{\text{COGS}}{\text{Trade Receivable}}$$

The smaller ratio means that the firm is paying its debt on deferred basis. Unless the firm is not currently under financial distress, that shows the firm has a proper payables policy and will not face with liquidity problems. An increase in the accounts payable ratio will lead the firm to pay its debts in a shorter period which means a greater working capital will be needed to manage the condition (Akdoğan, N. and Tenker, N., 1988).

1.8.2.4. Net Working Capital Turnover Ratio;

That ratio is calculated by dividing the net sales to the net working capital, and used to determine the efficiency of the working capital.

$$\text{Net Working Capital Turnover Ratio} = \frac{\text{Net Sales}}{\text{Net Working Capital}}$$

1.8.2.5. Current Assets Turnover Ratio

That ratio is calculated by dividing the net sales to the current assets, and used to determine the efficiency of the current assets.

$$\text{Current Assets Turnover Ratio} = \frac{\text{Net Sales}}{\text{Current Assets}}$$

1.8.2.6. Total Assets Turnover Ratio

That ratio explains the efficiency level of the total assets and is calculated by dividing the net sales to the total assets.

$$\text{Total Assets Turnover Ratio} = \frac{\text{Net Sales}}{\text{Total Assets}}$$

Result of that equation is expected to be around 2 in the manufacturing sector. A greater ratio shows an increase in efficiency level of the utilized assets whereas decrease of

the ratio shows that the firm is no longer operating in full capacity (Akıncı, N. and Erdoğan, N., 1995).

Contrary to the traditional and static liquidity ratio analysis, cash conversion cycle provides dynamic insights (Richards and Laughlin,1980), and is accepted as a valuable measure of the operational efficiency.

1.9. CASH CONVERSION CYCLE

Cash conversion cycle (CCC) is a concept developed by Richards and Laughlin (1980) and defined as a metric that expresses the length of time needed by a firm to convert its resources into cash flows. In its simplest form, CCC refers to the time length required for the cash paid out for the purchases to turn back as the money is collected from their sales. Through combining the key elements of a firm's core operations in terms of purchases and payments, production and stocking, as well as sales and receivables collection, Cash Conversion Cycle (CCC) provides a highly comprehensive measure for determination of operational efficiency and it becomes an effective tool for an efficient working capital management.

According to Hayes (2019), CCC attempts to measure how long each net input of cash is tied up in manufacturing and sales processes before it is converted into the cash again. That means, the CCC explains how much time the firm needs to sell its inventory and collect its receivables and when it has to pay its bills without incurring penalties. In other word, it refers to the length of a firm's regular business cycle from its core operations that starts with the cash used to pay for the purchases and ends with the cash received from the sales.

A trend of decreasing or steady CCC levels over multiple periods might be a good sign, while rising ones should lead to more investigation and analysis based on other factors. However, some other researchers support that investing more in cash conversion cycle may lead to increased profitability since maintaining high inventory levels is expected to increase sales, reduce supply costs and costs of possible interruption in production, and protect against price fluctuations (Blinder and Maccini, 1991). A longer days of sales outstanding may also strengthen the relationship with customers and hence may lead to an increase in sales revenue (Ng et al, 1999). Summers and Wilson (2000) also stated that more than 80% of the daily business transactions in the UK corporate sector is on credit terms.

CCC comprises days of sales outstanding (“DSO”), days of inventory outstanding (“DIO”), and days of payables outstanding (“DPO”), where DPO is the number of days’ credit before a firm pays its suppliers and subcontractors, DIO is the length of the manufacturing process and the number of days that the goods remain in the firm before they are sold, and DSO is the average payment collection period from the firm’s customers (Chen, 2011). In other words, CCC is a proxy for the next time interval between a firm’s cash expenditures for purchases and its final recovery of cash receipts in terms of days (Yazdanfar and Ohman 2014).

In the below chart, Rehn, E., (2012) has figured out the relation between procurement, inventory management and sales processes.

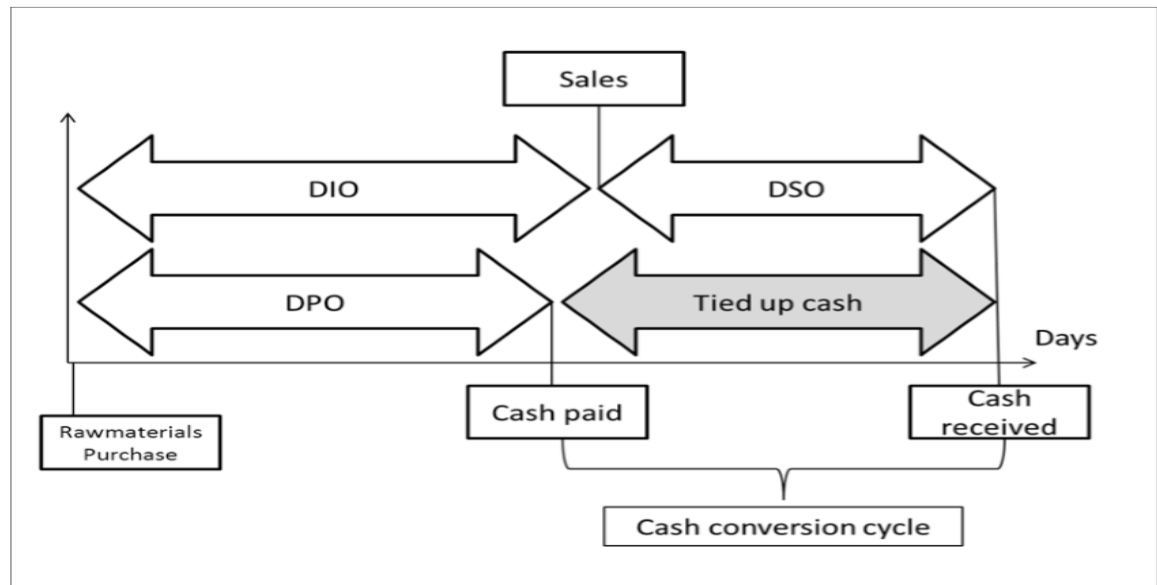


Figure 2. Sample model of cash conversion cycle (Source: Rehn, E., 2012: p:13)

As its shown in the above chart, the CCC starts with the payment to the supplier and ends with the collection of the sales revenue from of the finished goods. As a beginning of the CCC. the firm, pays to its supplier and receives the goods in its inventory. Following to that, the firm puts its know-how in the raw material (or semi-finished good) and tries to achieve the finished good to be delivered to the final user (or client). At the last step, the firms deliver the finished goods to the client and receives the cash into its accounts (Rehn, E. 2012).

Richards and Laughlin (1980) suggest that a cash conversion cycle analysis should be used instead of traditional but static liquidity ratio analysis because the CCC provides

dynamic insights, moreover, CCC enables companies to negotiate payment terms and trade credits. Further it also helps to determine the optimal inventory they should have been carrying to fulfil their liabilities effectively and thereupon obviously impacts the liquidity and more than that, the profitability of the firm (Da Costa, 2014).

In order to measure the CCC, below parameters are used;

- Revenue and cost of goods sold (COGS) from the income statement,
- Inventory at the beginning and the ending of the respective time period,
- Account receivable (A/R) at the beginning and the ending of the respective time period,
- Accounts payable (A/P) at the beginning and the ending of the respective time period, and
- The number of days (D) of the respective time period.

1.9.1. Days of Sales Outstanding (DSO)

The first parameter focuses on the current sales and represents how long it takes to collect the cash generated from the sales. This is a measure for the average days within which a company collects cash after the sale of a product or service. A low DSO means that a company collect its receivables within a short period of time whereas a high DSO means that a company collects its receivables within long period of time. So that, DSO can also be used to measure how effective the company is bringing money in.

The equation accepted for measuring of DSO is as follows;

$$DSO = \frac{(AR_t + AR_{t0})/2}{Revenue} \times D$$

Here;

DSO	: Days of sales outstanding
AR _t	: Beginning balance of accounts receivable
AR _{t0}	: Ending balance of accounts receivable
Average Accounts Receivable	: ½ x (Beginning + Ending accounts receivables)
Revenue	: The total earnings of a company for the represented period

D : The number of days in the period (in case of a different period is studied that part shall be adjusted accordingly)

1.9.2. Days of Inventory Outstanding (DIO)

Second parameter is related to the existing inventory level and represents how long it will take for the business to sell its inventory. Although there are some exceptional industries where the following applies vice versa, in most cases, lower values of DIO are favorable to the company whereas higher ones should be avoided. However, at that point a perfect good balance should always be observed so that the inventory must be kept at a safe level in a way that no sales are lost because of stock-outs.

DIO is calculated based on cost of goods sold (COGS), which represents the cost of acquiring or manufacturing the products that a company sells during a certain period. That is to mean, DIO represents the frequent of dispatching the stored goods to the manufacturing processes.

The equation accepted for measuring of DIO is as follows;

$$DIO = \frac{(Inv_t + Inv_{t0})/2}{COGS} \times D$$

Here;

DIO : Days of inventory outstanding

Inv_t : Beginning balance of inventory

Inv_{t0} : Ending balance of inventory

Average Inventory : $\frac{1}{2} \times (\text{Beginning inventory} + \text{Ending Inventory})$

COGS : Cost of goods sold

D : The number of days in the period (in case of a different period is studied that part shall be adjusted accordingly)

1.9.3. Days of Payables Outstanding (DPO):

The third parameter focuses on the current outstanding payable accounts of the business. DPO is a measure of the average days within which a company pays cash to the supplier following the purchase of a product or service. A high DPO means that there is a long time between the act of purchase and the payment to suppliers and thus it provides the company with extra liquidity. This ratio highly depends on the industry within which a

company works, being an example, payments in Building industry takes longer than payments in Fast Moving Consumer Goods (FMCG).

DPO defines the amount of money that a company owes its current suppliers related to the inventory and goods purchased, and represents the time spend in which the company must pay off those obligations.

The used mathematical formula for calculation of DPO is defined as below;

$$DPO = \frac{(AP_t + AP_{t0})/2}{COGS} \times D$$

Here;

- DPO : Days of payable outstanding
 AP_t : Beginning balance of inventory
 AP_{t0} : Ending balance of inventory
 Average Accounts Payable : ½ x (Beginning + Ending balance of accounts payables)
 COGS : Cost of goods sold
 D : The number of days in the period (in case of a different period is studied that part shall be adjusted accordingly)

1.9.4. Cash Conversion Cycle:

Metric	Calculation	Usage / Defines
DIO	$DOI = \frac{(Inv_t + Inv_{t0})/2}{COGS} \times 365$	Inventory turnover time in days defined as cost of goods sold
DSO	$DSO = \frac{(AR_t + AR_{t0})/2}{Revenue} \times 365$	Days credit given to customers
DPO	$DPO = \frac{(AP_t + AP_{t0})/2}{COGS} \times 365$	Days credit given by suppliers
CCC	$CCC = DSO + DIO - DPO$	How many days it takes for the company to receive cash after cash outlay

Figure 3. Summary of the formulas needed for calculation of CCC on an annual basis. (Source: Rehn, E., 2012)

Stadtler, H., (2005), proposes a study of management on supply chain where the time horizon relative to the operational schedule corresponds to the financial schedule. To increase performance, financial considerations must be done at every production level, from planning to control, in order to avoid bank overdraft.

CCC is one of the critical factors for a company to be successful in running business by representing how well the company manages its liquidity where a low CCC indicates that the company has low financial cost to fund its business operation (Tangsucheeva and Prabhu, 2013). On the other hand, a high level of CCC can be regarded as a sign of a need for additional funding in order to support firm's operations. The increase in the level of used sources will generate a higher cost of finance that might have a negative impact on firm's profitability.

While firms attempting to decrease days of inventory outstanding, they should trace and evaluate their optimum inventory levels very carefully. Firm must avoid the risk of any shortage in its inventory which might lead to a delay or failure in delivery of the scheduled items. Financial effect of such shortages might lead to loss of customers, fall in revenues and/or increase in cost of supply due to un-scheduled urgent needs of inventory items.

It has been assumed that cash conversion cycle is closely related with the operational efficiency of the firms through their supply chain practices, because it describes the financial benefits accrued from an effective supply chain management (Christopher and Gattorna, 2005; Fawcett et al., 2007). More specifically, as a component of the working capital, the CCC is a key performance indicator of operational efficiency because the metric is not only bridging across inbound material and service activities with suppliers and subcontractors, through manufacturing operations, and to the outbound sales activities with customers, but also indicates the value of net cash flows.

According to Pavlis et al (2018), the impact of suppliers' quality on the cash conversion cycle can be characterized by its negative effect on the days of receivables and days of inventory, by other means, supply management practices indicate that improved suppliers' quality reduces the days of collecting receivables due to the fact that customers have more incentives for early payment, moreover, suppliers' quality reduces the days that inventory is held, either because of an inventory turnover due to sales increase or because "the need for safety stock to hedge against this type of variation is obviated" (Foster, 2008).

However, suppliers' quality does not have a statistically significant effect on the days of payables.

In line with the above discussions, we will try to investigate impact of operational efficiency in terms of CCC which is a highly comprehensive measure of both operational efficiency and WCM as well as in terms of its sub-parameters. In addition to that, we will try to define type of the working capital management policy (such as conservative or aggressive) through make a comparison between manufacturing and service sectors



CHAPTER II.

LITERATURE REVIEW

There are many studies with various aims that executed for national and international cases. In addition to that, researchers have defined different results which might give us an idea of how the WCM impacts firm's profitability. For that purpose, the literature review is carried under two sub-titles where the first one focuses on foreign studies and other concentrates on studies that explicitly focus on Turkey.

2.1. FOREIGN STUDIES

Haresh (2012) provided an empirical evidence about the effects of working capital management on profitability performance of pharmaceutical companies listed on National Stock Exchange of India by using data collected for a period of 5 years (2005-06 and 2009-10), the results showed a negative relationship between account receivable and corporate profitability, thus it has been found that the managers can create value for their shareholders by reducing the number of days for accounts receivables and less profitable firms can pursue a decrease of their account receivable to reduce their cash gap in the cash conversion cycle.

Gill, Biger and Mathur (2010), executed a study consisting of 88 firms working in manufacturing sector based in USA, for the period of 2005 till 2007 and investigated the

relationship between firm's profitability and working capital through focusing on cash conversion cycle. As a result of this study, the researchers found a significant and positive relationship between the CCC and profitability.

Raheman, et. al., (2010), in their study on working capital management and corporate performance of Pakistani manufacturing sector found significant negative relationship between profitability and each of inventory turnover and the cash conversion cycle by using regression analytical tools however, it was indicated that insignificant negative and positive relationships subsist between profitability and each of average collection and payment periods respectively.

Kamath (1989) tested empirically the hypothesis of conflicting signals between current and quick ratio analysis and cash conversion cycle analysis and examined the relationship between the three above liquidity measures and firm's profitability, as well as whether the net trade cycle is a good approximation of the cash conversion cycle. Focussing on large firms in six retail industries for the period 1970-1984 he found that:

1. *“Current and quick ratios are negatively correlated with the cash conversion cycle;*
2. *Current and quick ratios are not negatively related to the profitability;*
3. *The net trade cycle provided the same information as the cash conversion cycle; and*
4. *Both cycles were found to be negatively correlated with the profitability measure.”*

Kamath (1989) has concluded that each measure can provide both useful information and misleading clues regarding the firm's liquidity position. Therefore, it was suggested to use all three measures in order to get better insight and reach efficiency of working capital management.

Besley and Meyer (1987) empirically investigated the interrelationships among the working capital accounts and the cash conversion cycle, the firm's industry classification and the rate of inflation and found that the cash conversion cycle is most correlated with the average age of inventory and least correlated with the age of spontaneous credit where the cash conversion cycle and its components is found to be different from one industry to another, but did not vary from year to year during the examination period which finally, the authors found that there is no significant correlation between the value of cash conversion cycle and the rate of inflation.

Deloof (2003) used a sample of Belgian firms and found that firms can increase their profitability by reducing the debtors' collection period and the days-in-inventory period. He also found that less profitable firms wait longer to pay their bills.

Wang (2002) used a sample of Japanese and Taiwanese firms and found that a shorter cash conversion cycle would lead to a better operating performance.

Teruel and Solano (2007) took samples of small to medium-sized Spanish firms for the period of 1996-2002 and found that the firms can create value by reducing the days-in-inventory period and the debtors collection period, thus leading to the reduction in the cash conversion cycle.

Belt (1985) has examined the trends of cash conversion cycle and its components during the period of 1950-1983, for those lines of businesses for which Quarterly Financial Report (QFR) for Manufacturing, Mining and Trade Corporations data exists and he found that retailing and wholesaling firms both had cash conversion cycles shorter than those of manufacturing firms where the mining firms had the shortest cash conversion cycle because this type of industry has the longest payment deferral period of all the major business types and finally, Belt (1985) has found that cyclical phenomena are apparent where the cash conversion cycle increases during periods of recession and the nondurable goods' cash conversion cycle has declined persistently, while the durable goods cash conversion cycle has been unstable but declining for the examined time period.

Vijayakumar (2002) examined the effects of growth rate of sales, vertical integration and leverage on profitability by regressing profitability on current ratio, operating expenses to sales ratio and inventory turnover ratio, it was observed that efficiency in inventory management and current assets are essential to improving profitability.

Majeed, Makki, Saleem, and Aziz (2013) examine the impact of cash conversion cycle on the performance of Pakistani manufacturing firms where the study used the sample of 32 companies selected randomly from three manufacturing sectors i.e. chemical, automobiles and construction and material for the period of five years ranging from 2006 to 2010 where the correlation and regression analyses were used and the study found that the average collection period of accounts receivables, inventory conversion period and Cash conversion cycle (CCC) have negative relationship with firm's performance.

Kamath (1989) empirically tested the hypothesis of conflicting signals between current and quick ratio analysis and cash conversion cycle analysis, and additionally he studied whether the net trade cycle is an excellent estimation of the cash conversion cycle in addition to the relationships between the three above liquidity measures and determinants of firm's profitability which considering US big firms in six trade industries he found that both current and quick ratios are inversely related with the cash conversion cycle while current and quick ratios are positively correlated to the profitability and in addition to that, the net trade cycle gave similar result as the cash conversion cycle and both cycles were found to be inversely related with the profitability determinants.

The study of Pavlis et al (2008) points that buying materials has no impact on days of receivables and days of payables, which were found to be significant for the financial performance and the cash flows of SMEs where finding of their study is that buying at low prices increases the days of inventory held, due to the fact that firms buy large quantities of items to take advantage of the discount offered where the limited impact of price of buying materials on the cash conversion cycle gives us the opportunity to assume that, despite the tendency of manufacturing companies to move their facilities to low cost countries, the issues of quality, flexibility, and information sharing in the supply chain remains critical to the daily operations, hence, enterprises increase profit margins and financial performance because they sustain high levels of supply management performance at lower operational and material costs.

Rezazadeh and Heidarian (2010) in their study investigated the effect of working capital management on the profitability of Iranian companies, where for this purpose, a sample of 1356 Iranian listed companies in Tehran Stock Exchange during the period of 1997-2007 is examined and the results show that management can create value for the company by reducing the amount of inventory and the number of days in collection period and additionally, their findings also suggest that a shorter cash conversion cycle leads to an increase in the profitability of the companies.

Rimo and Panbunyuen (2010) investigated the effects of company specific characteristics on the working capital management in Swedish listed companies by employing quantitative method where the sampled 40 companies in the large capital investment segment listed on NASDAQ OMX Stockholm Exchange with 2007 and 2008

financial data are examined by using regression analysis, and their results indicate that there is a significant positive association between profitability and the cash conversion cycle which considering the components of the cash conversion cycle, the regression results point that a significant positive relation exists between number of days of inventory and profitability.

Charitou et al. (2010) empirically investigated the effect of working capital management on firm's financial performance in an emerging market where it was hypothesized that working capital management leads to improved profitability which data set consists of firms listed in the Cyprus Stock Exchange for the period of 1998-2007, and by using multivariate regression analysis, the results support the hypothesis, specifically, the results indicate that the cash conversion cycle and all its major components; namely, days in inventory, days sales outstanding and creditors' payment period are all associated with the firm's profitability.

Wongthatsaneorn (2010) investigated cash to cash cycle management on profitability of private hospitals in Thailand by regular and panel data regression analyses where results show that only the independent variable of account payable is negatively related to Asset Turnover (A/T) under the control variables and the rest of the independent variables statically reveal no relationship with A/T where on the other hand, the results from panel data regression show that both receivable conversion period, and average payables period are negatively related with A/T which it is concluded that the listed firms in SET can increase corporate profitability by decreasing A/R and A/P.

Prior studies reported that working capital management may have an important effect on the firm's profitability, where Shin and Soenen (1998), Lazaridis and Tryfonidis (2006), Raheman and Nasr (2007), among others, measured working capital with cash conversion cycle, which consists of days of inventory outstanding, days of sales outstanding and days of payable outstanding. These researchers supported that greater investment in working capital (the longer cash conversion cycle) leads to reduction in the firm's profitability (Nazir and Afza, 2009).

Miller (1979) argues that the traditional definition of working capital can be improved by using the working capital leverage ratio, the ratio of current liabilities to

working capital; the ratio of current liabilities to current assets; and the ratio of working capital to current assets.

Abdulrasheed, A., et.al. (2011) assessed inventory management in selected small businesses in Kwara State, Nigeria by using a regression model to explain the effect of inventory value on performance which substituted by profit over a period of ten years, the study revealed that a Naira change in stock would cause almost a Naira (92 Kobo) change in profitability of selected businesses where this result indicated a strong positive relationship between inventory and profitability of small businesses in Kwara State of Nigeria and they thus concluded that small businesses are likely to generate higher profit if an effective inventory management is put in place.

Kuau and Singh (2013) analyzed the working capital performance of 164 manufacturing BSE 200 companies classified into 19 industries over the period of 2000-2010. The research is based on working capital score calculated by using normalized values of cash conversion efficiency, days operating cycle and days working capital and tested the relationship between the working capital score and the profitability as measured by income to current assets and income to average total assets. The results corroborated earlier studies that efficient management of working capital significantly affects profitability.

Alipour (2011) investigated the relationship between working capital management for the research period of 2001-2006 and has sampled 1063 out of 2628 firms by using multiple regression analysis and Pearson's correlation. The findings suggest a negative significant relation between days of sales outstanding and profitability, a negative significant relation between inventory turnover in days and profitability, a direct significant relation between number of days of payable outstanding and profitability and a negative significant relation between cash conversion cycle and profitability.

Napompech (2012) examined the effects of working capital management on profitability by using regression analysis based on a panel sample of 255 companies listed on the Stock Exchange of Thailand from 2007 through 2009. The results revealed a negative relationship between the gross operating profits and inventory conversion period and the receivables collection period, suggesting that managers can increase the profitability of their firms by shortening the cash conversion cycle, inventory conversion period, and receivables

collection period. However, the findings point that they cannot increase profitability by lengthening the payables deferral period.

Takon (2013) investigated the impact of cash conversion cycle on return on assets (ROA) of selected 46 Nigerian quoted firms for the period, 2000-2009. Multiple regression technique was used in analysing the models for testing the hypothesis. The results showed that cash conversion cycle had a significant negative relationship with profitability. Based on the findings, the study recommends that firms can try to reduce the number of days in cash conversion cycle in order to increase profitability as to create value for shareholders.

Warnes (2013), examined the impact of working capital management on the profitability over the period of five years from 2007-2011 by utilizing the data of cement manufacturing firms listed at Karachi stock exchange (KSE). Multiple regression models are applied and the findings of the study validated a negative relationship between determinants of working capital management and profitability for the cement manufacturing firms. Days of inventory outstanding (DIO) is found to have a significant positive impact on Return on Asset (ROA). Cash conversion cycle (CCC) is also reported to have a significant positive impact on Return on Asset (ROA). That means reductions in cash conversion cycle (CCC) will lead to an improvement in the profitability of the firms. Return on Asset (ROA) regression model reports that days of payable outstanding (DPO) has a significant negative impact on Return on Asset (ROA) of the firms. Overall, the results are concluded to suggest that by reducing the period of cash conversion cycle at a certain level, profitability of cement manufacturing firms can be increased.

In addition to that, some other researchers support that investing more in cash conversion cycle may lead to increased profitability since maintaining high inventory levels is expected to increase sales, reduce supply costs, reduce cost of possible interruption in production and protect against price fluctuations (Blinder and Maccini, 1991). A longer days of sales outstanding may also strengthen the relationship with customers and hence may lead to an increase in sales revenue (Ng et al, 1999). Summers and Wilson (2000) also stated that more than 80% of the daily business transactions in the UK corporate sector is on credit terms.

2.2. DOMESTIC STUDIES

Yücel and Kurt (2002) have studied the relationships among company scale, sectors and the CCC, profitability and liquidity. The used data set is collected for the firms listed in BIST. As the findings reveal liquidity ratios have positive relationship with CCC, and negative relationship with profitability, but have no relationship with leverage ratios. Moreover, it is observed that cash conversion cycle varies according to sectors. It is observed that the cash conversion cycle of companies in industry sector is longer when compared with the other sectors. Besides, cash conversion cycle is not observed to change during the recession while large scale companies are found to have longer cash conversion cycles compared to small and medium-sized entities (SMEs).

Samiloglu and Demirgunes (2008), has executed a study by considering statistically significant relationships between firm profitability and the components of cash conversion cycle at length for a sample of BIST listed manufacturing firms for the period of 1998-2007. The analyses are conducted by using a multiple regression model. Empirical findings of the study show that accounts receivables period, inventory period and leverage affect firm profitability negatively. On the other hand, growth in sales is found to affect firm profitability positively.

Through focusing on the cement manufacturing sector for the period of 1995-2001, Akgun (2002) concluded that days of inventory outstanding affects CCC more than days of sales outstanding. Further the efficiency level of the CCC is concluded to remain constant, and in order to shorten cash cycling period enterprises should extend the days of payable outstanding.

Çakır (2013) has accomplished an analysis by using the financial data of 52 manufacturing company that are publically traded in BIST between the years 2000-2010. As conclusion of the study, Çakır has determined that, in majority part of the manufacturing industry, companies may increase their profitability by extending their CCC levels. In contrast with that, CCC levels and profitability has an opposite relation in chemical and stone sub-sectors.

Akdoğan and Dinç (2019), has executed a study which focused on the profitability impacts of working capital management policies of Turkish agribusiness, and aims to investigate the potential effects of globalization on these interrelated relationships, for a

period of 3 years (between 2013-2015). The findings of that study suggest that Turkish agribusiness can enhance their profitability and create value for their shareholders by adopting conservative working capital management policies. Besides, working capital management efficiency, profitability and value are found to deteriorate as Turkey becomes more globalized during the research period under consideration. It can be concluded that managers of Turkish agribusiness can create a positive value by lengthening the cash conversion cycle up to an optimal level, and both managers and policy makers should concern with the competitiveness impacts of globalizations in developing strategies.

Lyrودي and Lazaridis (2000) examined the relationship between profitability and cash conversion cycles of firms in food sector in Greece and they also used variables like liquidity, profitability, debt structure and size of company in their study. While they couldn't find any relationship between cash conversion time and leverage ratio, they have determined a positive relationship between liquidity and profitability ratios. On the other side, they further suggest that there is no difference in terms of liquidity ratios between small and large scale companies.

Karadagli (2012) focuses on the effects of WCM as quantified by cash conversion cycle and net trade cycle to the firm's performance for a data set of Turkish companies, for the period of 2002-2010. With that study, Karadagli, searched for the potential differences between the profitability effects of the WCM for the SMEs with an additional aim to examine whether net trade cycle can efficiently substitute for cash conversion cycle as a measure of working capital management. The findings indicate that an increase in both the cash conversion cycle and the net trade cycle improve firm performance in terms of both the operating income and the stock market return.

İşeri and Chambers (2003) comparatively examined the CCC of various companies that are publically traded in the BIST for the years of 1999, 2000 and 2001. The sample is composed of companies that are operating in food, drink and tobacco sectors as manufacturers and retailers. The findings of the study point that most of the manufacturers and all of the retailers has negative CCC levels.

Through focusing on SMEs that are publically traded in BIST for the period 2003-2006, Sakarya (2008) suggests that due to longer CCC periods, the SMEs spends more time

to obtain finance and their working capital is increasing, and concludes that SMEs have insufficient cash management.

Omağ (2009) has executed a study through using data of companies that are operating in food sector in the USA and Turkey for the period of 2002-2007. As result of that study, Omağ has determined that the CCC levels of the Turkish firms are fluctuating more than the firms in the USA.

Coşkun and Kök (2011) has undertaken an analysis by using the financial data of 74 manufacturing companies that are publically traded in BIST between the years 1991-2005 uninterruptedly, via using the forecasting method of System-GMM (Generalized Method of Moment). Their findings suggest that days of sales outstanding and days of inventory outstanding is negatively related with profitability while a positive relation has been determined between the days of payable outstanding and the profitability.

Karaduman, Akbaş, Çalışkan ve Durer (2011) examined the effects of working capital management on profitability for companies that publically traded in BIST for the period of 2005-2009. As conclusion of that study, its determined that a decrease in days of sales outstanding, days of inventory outstanding and accounts payable levels leads to an increase in return on assets, while a decrease in CCC is found to have a positive effect on companies' return on assets.

Karadeniz, E. (2012) examined the CCC levels for companies operating in tourism sector that are publically traded in BIST between the years 2002-2010 by using the industrial financial statements that are prepared by Central Bank of Turkey for hotels and restaurants. As a result of that analysis, CCC of hotel and restaurants has been determined negative in comparing to normal levels of the sector. Also it has been determined that, days of inventory outstanding affects the CCC levels of Turkish tourism sector much more than the days of sales outstanding levels.

In order to determine the relationship between the working capital management and profitability, Keskin and Gökalp (2016) examined a study on firms that are operating in food sector and quoted in BIST. Period of the study covers the years 2009-2013. As a result, they found that the CCC has a negative impact on firm's profitability.

Ata and Buğan (2016) has examined the relation between the working capital management and the enterprise value. The data set of the study consist 121 firms from the

manufacturing sector for the period of 2006-2014, and the results of the study indicate a positive relationship between the components of the working capital and the profitability performance.

CHAPTER III METHODOLOGY

This research thesis attempts to highlight the efficiency and profitability issues with regard to working capital management. For that purpose it not only investigates the profitability and financial performance impacts of working capital policies but also searches for any potential differences that may prevail among different industries through focusing on manufacturing and service industries by using panel data.

3.1. EMPIRICAL DATA AND THE MODELS

The research sample consist 55 firms from various industries that are actively being traded in Borsa Istanbul during the research period of 2009: Q1-2019: Q3. After excluding the financial companies and the holdings which totals 34 as well as 12 firms with major missing data, the final sample is reached with a total of 55 firms. The data for the firms in the final sample is collected from the financial statements (including but not limited to: balance sheets, income statements, working capital management tables, profitability tables) which are extracted from Bloomberg Essentials on quarterly basis.

The efficiency of working capital management is measured by the cash conversion cycle which also enables to determine whether aggressive or conservative working capital policy is more appropriate. Through combining the main components of a firm's operational efficiency and liquidity, cash conversion cycle stays at the core of working capital management. It not only provides a highly comprehensive measure of working capital management efficiency but also offers a widely accepted framework to establish the

relationship between working capital policy and firm performance. Further, to get a deeper insight, the impacts of the sub-parameters of cash conversion cycle, namely the Days of Sales Outstanding (DSO), Days of Inventory Outstanding (DIO) and Days of Payable Outstanding (DPO), are also investigated.

The financial performance and profitability of companies are measured by operating profit, operating cash flow and earnings before interest and taxes (EBIT). In the analysis, the natural logarithms of the performance measures are employed.

Firm sizes, as measured by the natural logarithm of total assets and gearing (=Total Debt/Total Equity), are used as firm specific control variables and real GDP growth rate which is obtained from IHS Markit, is used to control for the economic conjuncture along with two dummy variables, namely the seasonal dummy (Dq) and the sector dummy (Ds). While Dq is used to account for the seasonality effects, the aim of using Ds is twofold: It not only enables to control for the effects of possible differences among sectors but also provides an insight on whether there are any significant differences in-between. Sector information of the firms in the research sample is provided in Table 1 in order to provide an insight about the diversity of the sectors that the firms in the sample operate.

Main Sector	Number of Firms
Manufacturing	31
Retail, Wholesale, Hotel and Restaurants	10
Transportation, Storage and Communication	4
Technology	3
Electrical, Gas and Water	3
Education, Health, Sport and Other Social Services	2
Mining and Quarry	1
Construction	1

Table 1. List of firms considered in this research which collected from BIST 100 for the period of 2009 – 2019.

Considering the wide range of sectors that the firms in the research sample operate, Ds is composed by assigning three-digit sector codes based on Borsa Istanbul classification.

Finally, the below model is reached:

$$Y_{i,t} = \beta_0 + \beta_1 CCC_{i,t} + \beta_2 G_{i,t} + \beta_3 Size_{i,t} + \beta_4 GDPgr_t + \beta_5 D_q + \beta_5 D_s + \varepsilon \quad (i)$$

where Y denotes the profitability measures, specifically the operating profit, operating cash flow and EBIT.

The model (i) is the first equation of this research study and covers the whole sample. Through highlighting the effect of CCC on firm's financial performance and profitability, it enables to determine whether aggressive or conservative working capital policy is more promising. Besides, it also provides insights on whether there are any significant differences among sectors. As studied by various researchers that are provided in the Literature Review Chapter of this thesis, the impact of CCC on profitability varies from one sector to other and also from one season to another. While in some sectors a shorter CCC leads the firm to a higher profitability and thus favours aggressive working capital policy, in others a longer CCC is found to enhance profitability and hence favours conservative working capital policy. Considering the conflicting results of the past empirical research and given the importance of the subject topic, the question of how to increase the operational efficiency and improve profitability stays as a vital question for the success and even for the survival of a company. Thus, this model is designed to examine the relationship between the CCC and firm profitability for the whole sample and to provide an insight on whether aggressive or conservative working capital policy seems more promising for BIST100 companies which is composed of the largest firms in Turkey.

Next, in order to have a deeper understanding on the dynamics of this relationship, Model (i) is redesigned to concentrate on the single sub-parameters of CCC leading to the following model.

$$Y_{i,t} = \beta_0 + \beta_1 DSO_{i,t} + \beta_2 DIO_{i,t} + \beta_3 DPO_{i,t} + \beta_4 G_{i,t} + \beta_5 Size_{i,t} + \beta_6 GDPgr_t + \beta_7 D_q + \beta_8 D_s + \varepsilon \quad (ii)$$

Where DSO, DIO and DPO denote days of sales outstanding, days of inventory outstanding and days of payable outstanding respectively.

As can be followed from the second equation, in Model (ii), instead of CCC, its separate components are inserted, specifically DSO, DIO and DPO to get a deeper grasp on the dynamics of this effect. While the first model assists to investigate the CCC's impact on profitability, it is also important to understand the reason behind that impact. For example, a negative impact on profitability might be due to long durations of receivable collection and/or long inventory turnovers while a positive impact on profitability might be faced due

to shorter duration of receivable collection and/or longer duration of account payable turnovers. Thus the main motivation of running Model (ii) is to be able to analyse the separate impacts of the sub-parameters of CCC on firm's profitability.

Next, with reference to various past empirical researches which are provided in Literature Survey Section, it's known that the impacts of CCC and its sub-parameters can vary significantly from one sector to the other. Thus, with the aim of searching for any potential differences among industries, the first two models are redesigned to account for manufacturing and service companies separately which brings in the below two models:

$$Y_{i,t} = \beta_0 + \beta_1 CCC_{Mi,t} + \beta_2 CCC_{Si,t} + \beta_3 G_{i,t} + \beta_4 Size_{i,t} + \beta_5 GDP_{gr,t} + \beta_6 D_{ind} + \beta_7 D_q + \beta_8 D_s + \varepsilon$$

(iii)

Where CCC_M and CCC_S denote the cash conversion cycle of the firms that are categorized in the manufacturing sector and in the service sector, respectively. D_{ind} represents the dummy variable used to distinguish whether the firm is a manufacturing or a service company. It takes a value of 1 for a manufacturing company, and 0 otherwise.

$$Y_{i,t} = \beta_0 + \beta_1 DSO_{Mi,t} + \beta_1 DSO_{Si,t} + \beta_2 DIO_{Mi,t} + \beta_2 DIO_{Si,t} + \beta_3 DPO_{Mi,t} + \beta_3 DPO_{Si,t} + \beta_4 D_{ind} + \beta_5 G_{i,t} + \beta_6 Size_{i,t} + \beta_7 GDP_{gr,t} + \beta_8 D_q + \beta_9 D_s + \varepsilon$$

(iv)

Where DSO_M is the days of sales outstanding of the firms that are categorized in the manufacturing sector and DSO_S is the days of sales outstanding of the firms that are operating in service sector. Likewise, DIO_M is the days of inventory outstanding of the firms that are operating in the manufacturing sector and DIO_S is the days of inventory outstanding of the firms that are categorized in the service sector. Similarly, DPO_M is the days of payable outstanding of the firms that are operating in the manufacturing sector and DPO_S is the days of payable outstanding of the firms that are categorized in the service sector.

The Models (iii) and (iv) are structured to comparatively investigate the impacts of the CCC and its sub-elements of Days of Sales Outstanding, Days of Inventory Outstanding, Days of Payable Outstanding, on the profitability of the firms operating in manufacturing and service sectors which will enable to distinguish any potential differentiating dynamics in-between and thus will lead to a more comprehensive grasp on the relationships among working capital management, working capital policy and profitability. In these models, although D_{ind} is used to differentiate the sub-samples of manufacturing and service companies, D_s is still carried in the models because each industry is composed of different

sub-sectors which may still carry different dynamics that may affect the profitability effects of CCC and its sub-parameters.

Variables	Researcher	Purpose of the Study
ROA, CCC, DSO, DPO And DIO.	Padachi, (2006)	To investigate impact of working capital management on small firms' profitability in manufacturing sector.
Revenue to Total Assets, Revenue To Total Assets, CCC, DSO, DPO And DIO.	V. Ganesan, (2007)	To study impact of working capital management (WCM measured as CCC) on firm's performance, in various sectors.
OPMAR, EBIT, Financial and Liquidity Ratios, Debt Ratio, Total Assets, Sales.	Öztar, (2015)	To study impact of working capital management (WCM measured as CCC) on firm's performance, in various sectors.
Roa, Ccc, Dso, Dpo, Dio.	Warnes (2013)	To examine the impact of working capital management on the profitability on cement manufacturing firms.
Liquidity Ratios, Leverage Ratios, Profitability Variables, CCC.	Yücel and Kurt (2002)	To determine the relationship between company scale, sectors and the CCC, profitability and liquidity.
Liquidity Ratio, Profitability, Debt Ratio And Total Assets	Lyroudi and Lazaridis (2000)	To examined the relationship between profitability and cash conversion cycles of firms in food sector.

Table 2. Some of the past empirical researches that utilize similar variables.

As explained before, various variables have been selected in the analysis to investigate the relationships among working capital management, working capital policy and

firm performance/profitability where the definitions of these variables are summarized in Table 3 and the descriptive statistics are provided in Table 4.

Abbreviations	Descriptions	Explanations
LNOP	Operational Profit	= natural logarithm of operational profit
LNOPCASH	Operating Cash Flow	= natural logarithm of operational cash
LNEBIT	EBIT	= natural logarithm of earnings before interest and tax
CCC	Cash Conversion Cycle	= DSO + DIO – DPO
DSO	Days of Sales Outstanding	= (Average account receivable / Revenue) x 90
DIO	Days of Inventory Outstanding	= (Average Inventory/Cost Of Goods Sold) x 90
DPO	Days of Payable Outstanding	= (Average Payable/Cost Of Goods Sold) x 90
G	Gearing	= (Short Term Borrowing + Long Term Borrowing) / Total Assets
S	Size	= natural logarithm of total assets
GDPgr	Gross Domestic Product Growth Rate	= Quarterly real GDP Growth Rate

Table 3. Definitions of variables that allocated into the models of this study.

Variables	Mean	Median	Max.	Min.	Std.Dev.
LNOP	8,983855151	9,136277075	13,00964095	-0,36530793	1,696148968
LNOPCASH	4,711677277	4,815602086	8,649098262	-3,721402646	1,580396093
LNEBIT	4,528095707	4,655620865	8,699514748	-3,853754097	1,644038813
CCC	57,993037	49,4114	528,7674	-161,4305	68,46875456
DSO	60,79836883	54,16895	302,4028	1,7918	39,53158476
DIO	63,15102782	51,7206	499,781	0,2435	48,22330516
DPO	66,1058302	55,5056	232,1036	5,0024	38,09437492
G	151,7077198	66,913	27523,476	0	716,0053674
S	7284,804377	3098,821	135503	46,1494	11478,53067
GDPgr	4,895089274	5,388228073	11,49192694	-12,52644392	4,863887551

Table 4. Descriptive statistics of the data set.

The mean value of cash conversion cycle is 57,99 days and its standard deviation is 68,46 days. That means CCC might deviate (to be higher or lower) from its mean value by 68,46 days. Minimum value of the CCC is -161,4 days and the maximum is 528,76. So, the firms in the sample holds considerable deviations in their CCCs.

On the other hand, firms receive payments of their sales with an average of 60,79 days and its standard deviation is 39,5 days. The maximum period of time needed for cash collection of receivables is 302,40 days, while the minimum takes 1,79 days. On average, it takes 63,15 days to sell the inventory with a standard deviation of 48,22 days. Whereas, minimum length of days of inventory outstanding is 0,24 days and the maximum is 499,78 days. Furthermore, firms are paying for their purchases in an average of 66,10 days with a standard deviation of 38,09 days. The minimum days of payment is 5,00 and the maximum is 232,10. Again a considerable deviation among companies in the sample is observed for the sub-parameters of CCC. The ranges of CCC components for the whole time period of the study is provided in Figure 1 by using bubble chart.

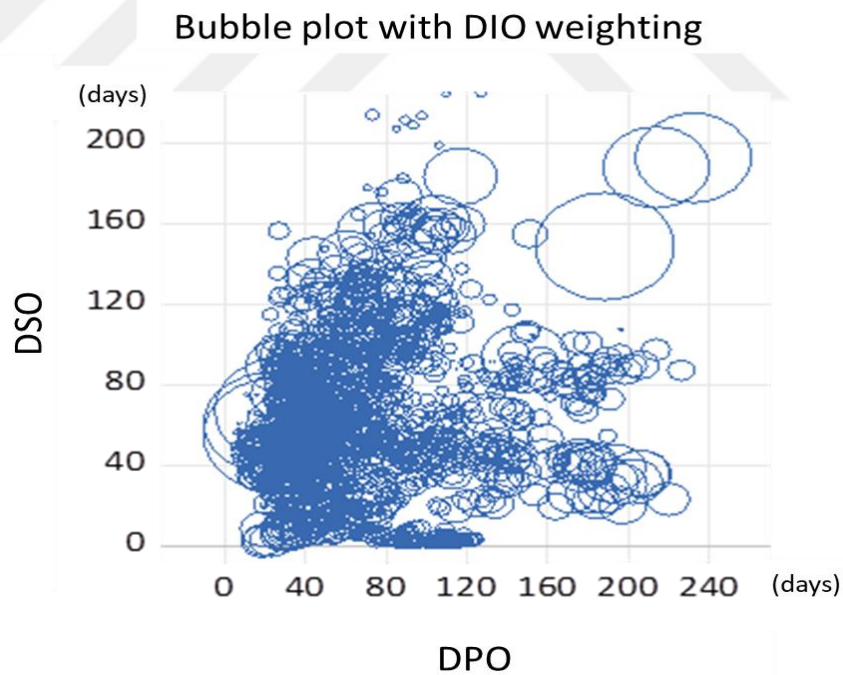


Figure 4. Bubble chart showing range of CCC Components for the whole time period of the study.

In addition to that, for the studied period, the GDP growth rate reaches to a maximum ratio of 11,49%, whereas the minimum recorded is -12,52%. The average GDP growth rate is realized at a rate of 4,89 % for a total of 43 quarters.

All the data and information are first consolidated in Excel and then analysed via EViews9 Software. Before running the above explained models, the identification tests and the model specification tests for panel analysis are applied.

3.2. IDENTIFICATION TESTS AND MODEL SPECIFICATION

This research is based on data collected during a certain period of time from companies working in different industries. By giving due consideration to the data used, it would be appropriate to state that the methodology used in this research is based on the panel data analysis. Panel data analysis means collection of data which is a mix of both the time series and the cross sectional data. Time series data is the type of data that includes variables depending on the days, months, seasons and/or years of a certain period whereas cross sectional data is the type of data that includes variables collected from various units at a certain point of time. In other words, panel data consists of “N” number of units and “T” number of observations, where each “T” must be related to a certain “N” (Uluyol ve Türk, 2013: 373-374).

Before applying the panel analysis, the model should be checked for heteroscedasticity, multicollinearity, normality and autocorrelation. In this respect, White test for heteroscedasticity, Variance Inflation Factor (VIF) for multicollinearity, Jarque-Bera test for normality and Lagrange Multiplier (LM) test for autocorrelation are performed. The obtained results suggest that there is no problem of heteroscedasticity, multicollinearity and autocorrelation in the models and the error terms are normally distributed. Besides, to determine the most appropriate panel model, F-test is conducted for fixed effects and Breusch and Pagan’s (1980) Lagrange Multiplier (LM) test is applied for random effects. Since the null hypotheses are not rejected in either case, the pooled OLS is preferred. Further, panel unit root tests are also applied to check for the stationarity of the data.

3.2.1. Panel Unit Root Tests:

To check the stationarity of the data, unit root tests are used. Since this research is based on panel analysis, panel unit root tests are applied to data. Specifically, the below four panel-based unit root tests are employed:

- Levin, Lin and Chu (2002) Test (“LLC”),

- The Fisher's ADF Type Test ("Fisher's ADF)
- The Fisher's PP Type Test ("Fisher's PP)
- Im, Pesaran and Shin (2003) Tests ("IPS")

3.2.1.1. Levin, Lin and Chu (2002) Test (LLC)

According to definition of (Levin et al., 2002) *"The test procedures are designed to evaluate the null hypothesis that each individual in the panel has integrated time series versus the alternative hypothesis that all individuals' time series are stationary. The pooling approach yields higher test power than performing a separate unit root test for each individual."*

According to studies of Baltagi, (2005), equation of LLC panel version is defined in below;

$$\Delta y_{it} = \delta y_{i,t-1} + \sum_{L=1}^p \alpha_{iL} \Delta y_{i,t-L} + \theta_{mi} d_{mt} + u_{it} \quad (1)$$

d_{mt} = vector of deterministic variable

θ_{mi} = the corresponding vector of coefficients for model $m = 1,2,3$.

d_{1t} = {empty set}

d_{2t} = {1}

d_{3t} = {1, t}.

The test improves the null hypothesis where series contain unit root against the alternative hypothesis. Series are stationary in alternative hypothesis.

$H_0: \delta=0$ (There is unit root / Series are not stationary)

$H_1: \delta<0$ (There isn't unit root / Series are stationary)

3.2.1.2. The Fisher's Type Test (Fisher-ADF and Fisher-PP)

"Maddala and Wu (1999) and Choi (2001) consider the shortcomings of both the LLC and IPS frameworks and offer an alternative testing strategy. Then, to test for unit root in panel data, they suggest to use a non-parametric Fisher-type test which is based on a combination of the p-values of the test-statistics for a unit root in each cross-sectional unit (the ADF test or other non-stationarity tests). Both IPS and Fisher tests combine information based on individual unit root tests and relax the restrictive assumption of the LLC test that ip is the same under the alternative. However, the Fisher test is built under more general assumptions than the previously proposed ones (Quah's, LLC and IPS tests). In fact, as Choi (2001) noted, previous tests suffer from some common inflexibilities which can restrict their use in applications:

- 1) they all require an infinite number of groups.

- 2) *all the groups are assumed to have the same type of nonstochastic component.*
- 3) *T is assumed to be the same for all the cross-section units and to consider the case of unbalanced panels further simulations are required.*
- 4) *as Levin and Lin, the critical values are sensitive to the choice of lag lengths in the ADF regressions.*
- 5) *finally, all the previous tests hypothesize that none of the groups have a unit root under the alternative hypothesis: they do not allow that some groups have a unit root and others do not.” (Barbieri, 2006 – N.43)*

In order to go beyond these limitations, Choi (2001) proposed a test based on the combination of p-values from a unit root test applied to each group in the panel data.

The model proposed by Choi (2001) is:

$$y_{it} = d_{it} + x_{it} \tag{2}$$

where, $i=1, 2, \dots, N$ and $t=1, 2, \dots, T$.

$$d_{it} = \alpha_{0i} + \alpha_{1i} t + \dots + \alpha_{mi} t^m$$

$$x_{it} = p_i x_{i(t-1)} + u_{it}$$

where u_{it} is integrated of order zero. Each time series y_{it} can be different depending on i .

The null hypothesis is:

$$H_0: p_i = 1 \text{ for all } i$$

which implies that all the time series are unit root non-stationary.

3.2.1.3. Im, Pesaran and Shin (2003) Tests (IPS)

That test suggests a new more flexible and computationally simple unit root testing procedure for panels (which is referred as T-bar statistic), that allows for simultaneous stationary and non-stationary series (i.e. ip can differ between individuals).

Moreover, this test allows for residual serial correlation and heterogeneity of the dynamics and error variances across groups.

Instead of pooling the data, IPS consider the mean of (A)DF statistics computed for each cross-section unit in the panel when the error term u_{it} of the model is serially correlated, possibly with different serial correlation patterns across cross-sectional units and T and N are sufficiently large. By substituting this u_{it} in (1), and considering a linear trend for each of the N cross-section units, we get the below equation; α

$$\Delta y_{it} = \alpha_{0i} + \rho_i y_{it-1} + \sum_{j=1}^{p_i} \phi_{ij} \Delta y_{i,t-j} + \varepsilon_{it} \quad (3)$$

where as usual, $i=1, 2, \dots, N$ and $t=1, 2, \dots, T$.

The null hypothesis is:

$$H_0: \rho_i = 0 \text{ for all } i$$

against an alternative;

$$H_a = \begin{cases} \rho_i < 0, & \text{for } i = 1, \dots, N \\ \rho_i = 0, & \text{for } i = N+1, \dots, N \end{cases} \quad \text{with } 0 < N_1 \leq N$$

that allows for some (but not all) of individual series to have unit roots.

The basics of these tests are summarized in Table 5.

Test	Null	Alternative	Possible Deterministic Component	Autocorrelation Correction Method
Levin, Lin and Chu	Unit root	No Unit Root	None, F, T	Lags
IPS	Unit Root	Some cross-sections without UR	F, T	Lags
Fisher-ADF	Unit Root	Some cross-sections without UR	None, F, T	Lags
Fisher-PP	Unit Root	Some cross-sections without UR	None, F, T	Kernel

Table 5. Summary of the applied panel unit root tests. None - no exogenous variables; F - fixed effect; and T - individual effect and individual trend (Source: EViews Innovative Solutions web-site. collected on 17.06.2020).

3.2.1.4. Results of The Panel Unit Root Tests

Following the above explanations, the results obtained from the panel unit root tests of Levin, Lin and Chu (2002) Test (LLC), Fisher's Type Test (Fisher-ADF and Fisher-PP) and Im, Pesaran and Shin (2003) Tests (IPS), are summarized in Table 6.

Tests Null: Unit root	LLC		Fisher ADF		Fisher PP		IPS	
	<i>Assumes Common Unit Root</i>		<i>Assumes Individual Unit Root Process</i>					
<i>Series</i>	<i>Statistic</i>	<i>Prob.</i>	<i>Statistic</i>	<i>Prob.</i>	<i>Statistic</i>	<i>Prob.</i>	<i>Statistic</i>	<i>Prob.</i>
LNOP	-13.7940	0.0000	444.382	0.0000	424.485	0.0000	-13.6666	0.0000
LNOPCASH	-15.7374	0.0000	520.996	0.0000	538.730	0.0000	-16.2943	0.0000
LNEBIT	-6.47808	0.0000	306.235	0.0000	307.370	0.0000	-7.76836	0.0000
CCC	-8.14175	0.0000	336.185	0.0000	359.881	0.0000	-10.8473	0.0000
DSO	-10.1730	0.0000	381.181	0.0000	394.129	0.0000	-13.3074	0.0000
DIO	-23.3508	0.0000	390.427	0.0000	411.563	0.0000	-16.6687	0.0000
DPO	-10.6560	0.0000	377.410	0.0000	388.862	0.0000	-11.7954	0.0000
GEARING	-7.94189	0.0000	285.140	0.0000	284.011	0.0000	-6.79268	0.0000
LNTA	4.76026	1.0000	38.5420	1.0000	43.3010	1.0000	10.3902	1.0000
D(LNTA)	-46.8807	0.0000	1491.26	0.0000	1534.64	0.0000	-43.7197	0.0000
GDP	-14.8503	0.0000	653.577	0.0000	610.659	0.0000	-21.7085	0.0000
Note: Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.								

Table 6. Panel Unit Root Tests applied to the whole data.

As can be followed from Table 6, the results of all tests suggest that the data for all variables except total assets are stationary. Thus, for total assets, since the first difference is found to be stationary, the first difference of total assets variable is used throughout the analyses.

CHAPTER IV

EMPIRICAL RESULTS AND DISCUSSIONS

The findings obtained from the pooled panel analyses of the pre-explained models for the three different performance/profitability measures provided three separate findings for each model which are presented and discussed in this section.

4.1. FINDINGS FOR MODEL (I)

The performance impacts of CCC for the whole sample are presented in Table 7 which provides a summary of the obtained results for the impact of CCC on three performance measures, namely the operating profit, the operating cash flow and EBIT separately and are labelled as Model 1A, Model 1B and Model 1C respectively.

	Model 1A (Operating Profit)	Model 1B (Operating Cash Flow)	Model 1C (EBIT)
CCC	-0.001454** (-2.299598)	-0.002574*** (-3.924388)	-0.002708*** (-4.976172)
Gearing	-1.97E-05 (-0.185001)	0.000126 (1.220072)	-2.99E-05 (-0.632608)
Size	0.834964* (1.891009)	1.077317** (2.392363)	0.912622** (2.510347)
GDPgr	-0.036258*** (-3.711095)	-0.045918*** (-4.729619)	-0.040345*** (-4.690804)
Dq	0.009729 (0.265440)	0.090364** (2.491255)	0.007632 (0.236636)
Ds	0.001761*** (7.990915)	0.002251*** (10.87656)	0.002511*** (12.59671)

Notes: t-statistics are presented in parentheses.

***, **, * denote statistical significance at 1%, 5% and 10% levels, respectively.

Table 7. Performance Impacts of CCC for the Whole Sample.

The findings show that, the CCC has a significant negative impact on operating profit at 5% significance level. Furthermore, a negative and significant impact of CCC is found on

operating cash flow and EBIT with a significance levels of 1%. That is to mean, a statistically significant decrease in CCC levels leads to an increase in operating profit, operating cash flow and EBIT of the firms in the sample for the studied period. As supported by various researchers such as Wang (2002), Gill, Biger and Mathur (2010), Kamath (1989), Rezazadeh and Heidarian (2010), (Nazir and Afza, 2009), Shin and Soenen (1998), Lazaridis and Tryfonidis (2006) ect., greater investment in working capital leads to a lower profitability. Thus, the results for Model 1 indicate that aggressive working capital policy enhances the financial performance and profitability of the sampled firms and leads to an increase in operating cash flows. However, these results should be interpreted cautiously since the sector dummy is found to be statistically significant at 1% significance level. Hence, these results may change considerably among different sectors and generalization of these findings may turn out to be highly misleading which deserves a more detailed analysis through focusing on different industries which are provided by the Models (iii) and (iv).

In addition to that, gearing, although statistically is not significant at conventional levels, is found to have a negative impact on operating profit and EBIT, and a positive impact on operating cash flow.

The findings also suggest that size of the firm has a positive impact on all performance measures, namely the operating profit, the operating cash flow and EBIT at 10%, 5% and 5% significance levels respectively which means that an increase in size of the firm, leads to higher levels of operating profit, operating cash flow and EBIT.

As another side finding, real GDP growth rate is found to have a negative impact on operating profit, operating cash flow and EBIT with significance levels of 1%. This result may somehow turn out to be surprising. But considering that the sample of this research consist the largest companies of Turkey, it may be due to a dampening in some of the advantages that larger firms enjoy as the economy fosters and to the increased competition by smaller firms with the expansion in the economy as an economic slowdown can be expected to hurt small and medium sized firms relatively more than the largest companies especially in emerging countries providing important advantages to the larger firms. Nonetheless, further research is needed to investigate the causes of such a situation.

The findings also point out that there is a significant relationship between Dq (seasonal dummy) and operating cash flow at level of 5% significance level which indicates

that the operating cash flow differs significantly from one season to another, while no significant seasonality impact is recorded for the profitability measures of operating income and EBIT. Thus the firms in the sample can be argued to manage the seasonality impacts of their operations effectively, probably through efficiently adjusting their operations in terms of production and inventory management as well as their expenses.

4.2. FINDINGS FOR MODEL (II)

Following the analysis of performance impacts of CCC for the whole sample, the performance impacts of its single components are also analysed for the whole sample by using Model (ii) which are provided in Table 8 for three separate performance measures which are labelled as Models 2A, 2B and 2C.

	Model 2A (Operating Profit)	Model 2B (Operating Cash Flow)	Model 2C (EBIT)
DSO	-0.000240*** (-11.82601)	-0.000148*** (-8.027396)	-0.000316*** (-9.458888)
DIO	0.001001 (1.096332)	-0.000726 (-0.762505)	-0.000830 (-1.038795)
DPO	-1.18E-09 (-0.203957)	1.80E-09 (0.314640)	1.47E-08 (0.904791)
Gearing	4.17E-07 (0.003943)	0.000194* (1.894196)	-8.94E-06 (-0.187555)
Size	0.780808* (1.780816)	1.127859** (2.510539)	0.888013** (2.422742)
GDPgr	-0.036009*** (-3.694229)	-0.044332*** (-4.564721)	-0.039474*** (-4.565859)
Dq	0.009711 (0.265497)	0.092874** (2.563498)	0.011606 (0.358170)
Ds	0.001958*** (8.768783)	0.002420*** (11.46377)	0.002685*** (13.25321)

Notes: t-statistics are presented in parentheses.

***, **, * denote statistical significance at 1%, 5% and 10% levels, respectively.

Table 8. Performance Impacts of the Components of CCC for the Whole Sample.

As revealed by Table 8, the findings suggest that days of sales outstanding (DSO) has a statistically significant negative impact on operating profit, operating cash flow and EBIT at 1% significance levels. That means, when firms collect their receivables faster, their operating profit, operating cash flow and EBIT levels become greater. Those results are also in line with the findings of Coşkun and Kök (2011).

In addition to that, though statistically not significant at conventional levels, days of inventory outstanding (DIO) has a positive impact on operating profit and a negative impact on operating cash flow and EBIT.

Moreover, days of payable outstanding (DPO) is not found to have a statistically significant impact on either of the performance measures.

Although it is not the main concern of this research thesis, the performance impact of gearing as measured by operating cash flow is reported to be positive at 10% significance level while no statistically significant impact is reported for the performance measures of operating income and EBIT.

Additionally, the results also suggest a positive impact of size on operating profit, operating cash flow and EBIT at 10%, 5% and 5% significance levels respectively. Thus, as an additional finding, the results indicate that an increase in size of the firm improves firm performance.

In line with the findings of Model (i), the findings of Model (ii) also report a statistically significant negative impact of real GDP growth rate on all performance measures employed in this study, namely the operating profit, operating cash flow and EBIT at 1% significance levels which, as mentioned before, offers an interesting research question for future studies.

The findings also show that Dq has a statistically significant impact on operating cash flow at 5% significance level. This finding indicates that seasonality has a significant impact on the cash generated. However, in line with the findings obtained for Model (i), no statistically significant impact is reported for operating profit and EBIT.

Finally, Ds is again found to have a statistically significant impact on all performance measures at 1% significance level, underlining the importance of accounting for differences among sectors which may potentially change the results for some sectors considerably.

In terms of control and dummy variables, the findings obtained for Models (i) and (ii) are found to be consistent. Further, to sum up the findings with respect to the main scope of this research thesis, while days of sales outstanding (DSO) is found to have a statistically significant negative impact on firm performance, the findings lack to provide a statistically significant impact of days of inventory outstanding (DIO) and days of payable outstanding (DPO) which may somehow be a reflection of the fact that the research sample is composed

of the largest companies in Turkey. Overall, a comparative analysis of the results obtained for the performance measures can be argued to underline the importance of receivables management which also seems to be the main cause of the negative relationship between the CCC and firm performance as proposed by the findings of Model (i). Moreover, remembering that Ds has a statistically significant impact on all performance measures for both models, a deeper analysis is needed to account for industrial differences as well which may change the results considerably. So, as the next stage, these analyses are replicated by subsampling the manufacturing and service companies to distinguish any potential differences that prevail in-between the dynamics of manufacturing and service industries which are provided by the Models (iii) and (iv).

4.3. FINDINGS FOR MODEL (III)

As stated previously, results of Model (iii) provide important highlights that will enable to explain how performance impacts of CCC differ for manufacturing and service industries. The obtained results are summarized in Table 9.

	Model 3A (Operating Profit)	Model 3B (Operating Cash Flow)	Model 3C (EBIT)
CCC _M	-0.003511*** (-4.116977)	-0.003314*** (-3.749633)	-0.002145*** (-2.879320)
CCC _S	0.001931** (2.136594)	-0.002249** (-2.374832)	-0.003654*** (-4.951227)
Gearing	0.000137 (1.299465)	0.000246** (2.397827)	2.30E-05 (0.500374)
Size	0.587641 (1.379445)	1.056367** (2.421985)	0.983199*** (2.831347)
GDPgr	-0.034858*** (-3.650214)	-0.045578*** (-4.825546)	-0.042023*** (-5.098620)
D _{IND}	2.057591*** (13.76974)	1.240080*** (8.689345)	1.527450*** (12.38060)
D _q	0.011816 (0.330991)	0.092318*** (2.626652)	0.002392 (0.077834)
D _s	0.005122*** (16.69026)	0.004153*** (14.62535)	0.005374*** (20.38938)

Notes: t-statistics are presented in parentheses.

***, **, * denote statistical significance at 1%, 5% and 10% levels, respectively.

Table 9. Performance Impacts of CCC for Manufacturing and Service industries.

As the findings show, CCC is found to have a statistically significant negative impact on all performance measures, specifically the operating profit, operating cash flow and EBIT

at 1% significance levels for the firms operating in the manufacturing sector, and on the operating cash flow and EBIT of firms operating in the service industries at 5% and 1% significance levels respectively. However, the impact of CCC on the operating profit of service companies is reported to be positive at 1% significance level. These results indicate that the negative significant impact of CCC reported for the whole sample in terms of performance measure of operating profit mainly reflects the dynamics of manufacturing companies. In fact, as the results of Model (iii) reveal, a higher CCC is associated with higher operating profit for service companies. This result underlines the importance of accounting for industrial differences since failing to account for industrial differences can be vitally misleading. Indeed, contrary to findings reported by Model (i), conservative working capital policy is found to enhance the operating profit and thus the operational efficiency of service companies. On the other hand, since the impact of CCC for service companies is statistically found to be negative for EBIT, the profitability effect of CCC can be concluded to be ambiguous in service industry. However, operating profit can not only be argued to be a superior measure in terms of operational efficiency, it also provides a better proxy for a firm's profitability potential since it reports the financial results of a firm's main operations. In turn, to reach EBIT other revenues and expenses are also accounted. Thus, these results may be indicator of inefficient management of general and administrative issues and/or ineffective management of sales and advertising activities. This point certainly deserves more attention and future research should specifically focus on that interesting issue. On the other hand, since D_s is still found to have a statistically significant impact on all performance measures, accounting for industrial differences within broad categories such as manufacturing and services may not prove to be sufficient. Rather, it seems more appropriate to focus on sub-sectors.

In terms of control variables, although the impact of gearing on operating profit, operating cash flow and EBIT is reported to be positive, the only significant effect is reported for operating cash flow with a significance level of 10%. The impact of size, on the other hand, is found to be significantly positive for the performance measures of operating cash flow and EBIT at 5% and 1% significance levels respectively while no statistically significant effect of size is reported for operating profit at conventional levels, though it still holds a positive sign. The findings, once again, report a statistically significant negative

impact of real GDP growth rate on all performance measures, specifically the operating profit, operating cash flow and EBIT at 1% significance levels. As compared with the results obtained by the Models (i) and (ii) for control variables, the findings for Model (iii) are quite compatible.

4.4. FINDINGS FOR MODEL (IV)

Finally, to search for any potential differences that may prevail between the manufacturing and service companies with respect to the single components of CCC that may highlight the differentiating dynamics that may prevail in-between the manufacturing and service industries, Model (iv) is employed. This enabled to determine how the performance impacts of the single components of the CCC differ for the manufacturing and the service industries where the obtained results are summarized in Table 10.

	Model 4A (Operating Profit)	Model 4B (Operating Cash Flow)	Model 4C (EBIT)
DSO _M	-0.005949*** (-3.415456)	-0.014511*** (-7.861053)	-0.006654*** (-4.352400)
DSO _S	-0.000183*** (-9.243077)	-0.000124*** (-6.880203)	-0.000267*** (-8.390878)
DIO _M	-0.001486 (-1.056875)	0.005359*** (3.702509)	0.002310* (1.835576)
DIO _S	0.005412*** (4.861952)	-0.002518** (-2.185297)	-0.001027 (-1.093802)
DPO _M	0.004258*** (3.201079)	0.006761*** (4.789409)	0.004441*** (3.745733)
DPO _S	-1.01E-09 (-0.181267)	1.82E-09 (0.333949)	1.18E-08 (0.770098)
Gearing	6.59E-05 (0.656735)	0.000283*** (2.892984)	4.63E-05 (1.023999)
Size	0.538374 (1.307073)	1.081030** (2.553036)	0.864306** (2.526892)
GDPgr	-0.037462*** (-4.053865)	-0.046187*** (-5.043580)	-0.039663*** (-4.893758)
D _{IND}	2.061908*** (10.48324)	0.881979*** (4.553749)	1.373589*** (8.243512)
Dq	0.013259 (0.384840)	0.093605*** (2.750943)	0.013650 (0.452694)
Ds	0.004940*** (16.17818)	0.003751*** (13.10907)	0.005316*** (20.08259)

Notes: t-statistics are presented in parentheses.

***, **, * denote statistical significance at 1%, 5% and 10% levels, respectively.

Table 10. Performance Impacts of the Components of CCC for Manufacturing and Service Industries.

As can be followed from Table 10, consistent with the findings of Model (ii), days of sales outstanding (DSO) has a statistically significant negative impact on all performance measures, specifically the operating profit, operating cash flow and EBIT at 1% significance levels for both the manufacturing and service companies. That means, when firms collect their receivables faster, their profitability and performance improves. Those results are also in line with the findings of Coşkun and Kök (2011).

Days of inventory outstanding (DIO) is found to have a statistically significant positive impact on both the operating cash flow and EBIT with significance levels of 1% and 10%, respectively for the manufacturing companies whereas for service companies, it is found to have a statistically significant negative impact on operating cash flow at 5% significance level with no statistically significant impact on EBIT. Moreover, the impact of days of inventory outstanding (DIO) on operating profit of service companies is found to be positive at 1% significance level while, though statistically not significant at conventional levels, a negative impact is reported for manufacturing companies. These results pinpoint to significant differences in-between the manufacturing and the service companies. On the other hand, it is highly surprising to observe a statistically insignificant impact of days of inventory outstanding (DIO) on the operating profits of the manufacturing firms. However, this result may not necessarily point that it has no statistically significant impact on the operating profit since the Ds is still statistically significant at 1% significance level. Thus, it is also possible that the differentiating dynamics of the sub-sectors of the manufacturing industries cancels out the significant effects under each sub-sector which in turn translates into a lack of a significant impact for the broad category which, once again, underlines the necessity of focusing on the sub-sectors rather than on broad categories. In sum, a longer days of inventory outstanding (DIO) is found to lead a statistically significant increase in operating cash flow and EBIT of the firms operating in the manufacturing industry while it is associated with a statistically significant decrease in the operating cash flow and a statistically significant increase in the operating profit of the firms in the service industry.

As the impact of days of payable outstanding (DPO) is concerned, it is found to have a statistically significant positive impact on the operating profits, operating cash flows and EBITs of manufacturing companies at 1% significance level, indicating that manufacturing

companies can improve their financial performance through lengthening their payment duration of purchases while no statistically significant impact is reported for service companies.

It is also worthy to mention the side findings obtained for the control and dummy variables. As Table 10 reveals, gearing has a significant positive impact on operating cash flow at 1% significance level while no statistically significant impact is reported for operating profit and EBIT. Size is found to have a statistically significant positive impact on operating cash flow and EBIT at 5% significance levels with no significant impact on operating profit. As the real GDP growth rate is concerned, the findings suggest a statistically significant impact on all performance measures at 1% significance level. Besides, Dq has a statistically significant impact on operating cash flow while both Ds and Dind are found to affect all performance measures with 1% significance levels. These findings obtained for the control and the dummy variables are similar with the previously obtained results.

4.5. COMPARATIVE ANALYSIS OF THE RESULTS

Although the results for the whole sample indicate that aggressive working capital policy is promising for BIST 100 firms, a deeper analysis through focusing on the sub-samples of the manufacturing and the service companies raises the possibility that indeed conservative working capital policy may turn out to be more promising for the firms operating in service industries since the impact of CCC on operating profit which can be argued to provide a better measure of operational efficiency and short run profit generating ability is found to be significantly positive for service companies. However, the impact of CCC is still reported to be significantly negative on operating cash flow and EBIT of service companies which raises questions on the appropriate working capital policy conclusions for the firms operating in service industries. These conflicting results obtained for the operating profit and EBIT of service companies may arise from an inefficient management of general and administrative issues and/or ineffective management of sales and advertising activities, but certainly needs to be searched for in the future to come up with a satisfactory possible conclusion. The findings for Ds are also very important in the sense that it is still found to have a statistically significant impact on all performance measures after accounting for the industrial differences within broad categories, i.e. when the manufacturing and the service

companies are sub-sampled, which suggest that it may not be sufficient to distinguish among the broad industry groups. Rather, focusing on sub-sectors seems to be more appropriate.

As the single components of CCC are concerned, days of sales outstanding (DSO) is found to have a statistically significant negative impact on financial performance as measured by operating profit, operating cash flow and EBIT, with no statistically significant impact of days of inventory outstanding (DIO) and days of payable outstanding (DPO) on either of the performance measures for the whole sample. This indicates that the negative impact of CCC on the financial performance as the whole sample is considered, due to the impact of days of sales outstanding (DSO). When the manufacturing and service companies are sub-sampled, the findings still report a statistically significant negative impact of days of sales outstanding (DSO) on all the performance measures for both group of firms. However, the results for the days of inventory outstanding (DIO) suggest a statistically significant positive impact on the operating cash flow and EBIT of the manufacturing companies, and on the operating profit of the service companies while a statistically significant negative impact is reported for the operating cash flow of service companies. Besides, while the impact of days of payable outstanding (DPO) on all performance measures are found to be significantly positive for manufacturing companies, no statistically significant impact is recorded for service companies. Comparatively, these results not only highlight the importance of receivables management which is found to have a statistically significant negative impact on all performance measures under all models but also points to significant deviations among industries with respect to the performance impacts of days of inventory outstanding (DIO) and days of payable outstanding (DPO). Moreover, it is important to note that Ds is reported to have a statistically significant effect even when the industrial differences are accounted for. Thus, the findings constantly suggest that it would be more appropriate to focus on sub-sectors rather than broad industrial categories.

Finally, as the results of all the models are considered, it is observed that the findings for the control and the dummy variables are consistent throughout all the models.

CONCLUSION

It is widely accepted in the Finance Literature that an efficient working capital management supported by operational efficiency enhances firm profitability and value. Since failing to realize a firm's short-term obligations will derive the firm into financial distress and a poor profitability performance will lead to losses in the value of the firm, the management of short-term assets which actually bases on the core activities of a firm proves to be at least as important as the management of long-term financial assets. Given the importance of the short run operating decisions and the management of short run assets, this subject issue has attracted a wide interest in the literature. However, as there exists a wide array of both firm- and sector-specific factors that alter the efficiency of working capital management, it is not possible to come up with some certain solutions that will help all the firms. Rather, it requires an intensive investigation of the possible impacts of such variables on the operational efficiency of firms to help managers in giving their decisions more effectively and managing the firm's working capital more efficiently.

The efficiency of Working Capital Management is widely measured by the Cash Conversion Cycle in order to determine whether aggressive or conservative working capital policy enhances operational efficiency. CCC stands at the core of the working capital management studies due to fact that it is based on combining the key elements of its main operations, i.e. purchases and payments, production and stocking, as well as sales and receivables, which in turn affects a company's operational efficiency and liquidity with no doubt. In relation with these key elements, CCC comprises three components, namely days of sales outstanding (DSO) days of inventory outstanding (DIO) and days in payables outstanding (DPO), and thus provides a highly comprehensive measure of both the operational efficiency and the working capital management efficiency. In this respect, it offers a widely accepted framework to establish the relationship between working capital policy and company performance.

As pointed by Besley and Meyer (1987) and Belt (1985) among many others, the impact of CCC on profitability varies from one sector to other and also from one season to another. While in some sectors a shorter CCC leads the firm to a higher profitability and thus favours aggressive working capital policy, in others a longer CCC is found to enhance profitability and hence favours

conservative working capital policy. Considering the conflicting results of the past empirical research and given the importance of the subject topic, the question of how to increase the operational efficiency and improve profitability stays as a vital question for the success and even for the survival of a company.

Following the aforementioned arguments, this research thesis is designed to examine how the operational and working capital management efficiency can be improved through focusing on the impacts of CCC and its sub-parameters (DIO, DPO, DSO) on firm performance and to investigate any potential differences that may prevail in-between manufacturing and service companies with the aim of providing an additional insight on the dynamics behind these various inter-related factors that are argued to differ across firms and industries. For that purpose, first the impact of CCC on a firm's financial performance, as measured by operating profit, operating cash flow and EBIT, is examined with regard to the whole sample. Next, to get a deeper insight, the profitability impacts of the sub-parameters of Cash Conversion Cycle, namely the Days of Sales Outstanding (DSO), Days of Inventory Outstanding (DIO) and Days of Payable Outstanding (DPO) are also investigated. Moreover, the whole sample is divided into two sub-samples to distinguish the manufacturing and the service companies with an attempt to shed a light on the potential differences that may prevail in-between these two basic segments of an economy, specifically the manufacturing and the service industries, and further analyse the profitability impacts of both the CCC and its components on the performance of the firm's which will also enable to provide an insight on whether aggressive or conservative working capital policy seems more promising for the manufacturing and service companies as well as on the differentiating dynamics behind.

The research sample consist 55 firms from various industries that are actively being traded in Borsa Istanbul during the research period of 2009: Q1-2019: Q3. After excluding the financial companies and the holdings which totals 34 as well as 12 firms with major missing data, the final sample is reached with a total of 55 firms. The data for the firms in the final sample is collected from the financial statements (including but not limited to: balance sheets, income statements, working capital management tables, profitability tables) which are extracted from Bloomberg Essentials on quarterly basis. All the analyses are conducted by using pooled panel estimation as proposed by the model specification tests.

The research results for the whole sample suggest that the CCC has a significant negative impact on all of the three measures of financial performance. However, although the results for the whole sample indicate that aggressive working capital policy is promising for BIST 100 firms, a deeper analysis through focusing on the sub-samples of the manufacturing and the service companies raises the possibility that indeed conservative working capital policy may turn out to be more

promising for the firms operating in service industries since the impact of CCC on operating profit which can be argued to provide a better measure of operational efficiency and short run profit generating ability is found to be significantly positive for service companies. However, the impact of CCC is still reported to be significantly negative on operating cash flow and EBIT of service companies which raises questions on the appropriate working capital policy conclusions for the firms operating in service industries. These conflicting results obtained for the operating profit and EBIT of service companies may arise from an inefficient management of general and administrative issues and/or ineffective management of sales and advertising activities, but certainly needs to be searched for in the future to come up with a satisfactory possible conclusion. The findings for Ds are also very important in the sense that it is still found to have a statistically significant impact on all performance measures after accounting for the industrial differences within broad categories, i.e. when the manufacturing and the service companies are sub-sampled, which suggest that it may not be sufficient to distinguish among the broad industry groups. Rather, focusing on sub-sectors seems to be more appropriate.

As the single components of CCC are concerned, days of sales outstanding (DSO) is found to have a statistically significant negative impact on financial performance as measured by operating profit, operating cash flow and EBIT, with no statistically significant impact of days of inventory outstanding (DIO) and days of payable outstanding (DPO) on either of the performance measures for the whole sample. This indicates that the negative impact of CCC on the financial performance as the whole sample is considered, is due to the impact of days of sales outstanding (DSO). When the manufacturing and service companies are sub-sampled, the findings still report a statistically significant negative impact of days of sales outstanding (DSO) on all the performance measures for both group of firms. However, the results for the days of inventory outstanding (DIO) suggest a statistically significant positive impact on the operating cash flow and EBIT of the manufacturing companies, and on the operating profit of the service companies while a statistically significant negative impact is reported for the operating cash flow of service companies. Besides, while the impact of days of payable outstanding (DPO) on all performance measures are found to be significantly positive for manufacturing companies, no statistically significant impact is recorded for service companies. Comparatively, these results not only highlight the importance of receivables management which is found to have a statistically significant negative impact on all performance measures under all models but also points to significant deviations among industries with respect to the performance impacts of days of inventory outstanding (DIO) and days of payable outstanding (DPO). Moreover, it is important to note that Ds is reported to have a statistically significant effect even when the industrial differences are accounted for.

It is inevitable that more research is needed on these vital relationships to have a deeper understanding on the dynamics behind operational efficiency and sustaining an efficient working capital management. In light of the research results of this thesis and the past empirical evidence, it is highly recommended that future research should account for firm specific and sector specific factors. With respect to industry specific effects, it would be more appropriate to focus on sub-sectors rather than on broad industrial categories.



REFERENCES

Abdulrasheed, A., Yahaya, K. A., Isiaka, I., and Aliu, O.A., (2011), Inventory management in small business finance: empirical evidence from Kwara State, Nigeria. *British Journal of Economics, Finance and Management Sciences*, 2(1), 49 – 57. *Management Review*, 4(1), 8-21.

Agarwal, A., (2000), E-finance is the key element today: In tune with E-commerce, *Times of India*, July 3rd, 2000.

Akdoğan, E.C., and Dinç, D.T., (2019), Managing working capital efficiency in Turkish agribusiness and the impact of globalization: insight from an emerging market. *International Food and Agribusiness Management Review*, Vol. 22, Issue: 4; DOI: 10.22434/IFAMR2018.0069.

Akdoğan, N. and Tenker, N., (1988) *Finansal Tablolar ve Analizi*, 3. Baskı, Ankara: Gazi Üniversitesi Teknik Eğitim Fakültesi Matbaası, 1988, s.179-180.

Akgüç, Ö., (1998), *Finansal Yönetim*, 7. Baskı, İstanbul: Avcıol Basım Yayın, s.504.

Akgün, M., (2002), İşletmelerde Etkinlik ve Nakit Çevirme Süresi Analizi, *Mali Çözüm Dergisi*, Sayı:60. (12): 186-198.

Akıncı, N. and Erdoğan, N., (1995), *Finansal Tablolar ve Analizi*, 4. Baskı, İzmir: Barış Yayınları Fakülteler Kitabevi, 1995, s.270.

Aksoy, A., (1993), *İşletme Sermayesi Yönetimi*, Ankara: Gazi Kitabevi, 1993, s.15.

Aksoy A., and Yalçın K., (2008), *İşletme Sermayesi Yönetimi*, 4. Baskı, Ankara: Gazi Kitabevi, s.16-17.

Alipour, M., (2011), Working Capital Management and Corporate Profitability: Evidence from Iran, World Appl. Sci. J., 12 (7): 1093-1099, 2011.

Albayrak, A.S. and Akbulut, R., (2008), Sermaye Yapısını Belirleyen Faktörler: İMKB Sanayi Ve Hizmet Sektörlerinde İşlem Gören İşletmeler Üzerine Bir İnceleme, Dumlupınar Üniversitesi Sosyal Bilimler Dergisi, 22. Sayı, (2008): 425-446, s.429.

Apak, D. and Demirel E. (2010), Finansal Yönetim Finansal Tablolar Analizi Ve Yatırım Yönetimi (1. Baskı). İstanbul: Papatya Yayıncılık.

Arat M. E. and Çetin, A. (2011), *Finansal Durum Tabloları Analizi*, İstanbul: Marmara Üniversitesi Nihad Sayar Eğitim Vakfı Yayınları, 2011.

Arslan, Özgür (2003), Küçük ve Orta Ölçekli İşletmelerde Çalışma Sermayesi ve Bazı Finansal Yönetim Uygulamaları, C.Ü. İktisadi ve İdari Bilimler Dergisi, Cilt 4, Sayı 1, 2003, ss. 121-135.

Aydın, N. et.al. (2008), *Finansal Yönetim*. 6. Baskı. Eskişehir: Anadolu Üniversitesi Yayınları, 2008. s.117.

Ata, H.A, Buğan, M.F., (2016), İmalat Şirketlerinde Çalışma Sermayesi Etkinliğinin Firma Değerine Etkisi Nasıldır? Selçuk Ün. Sos. Bil. Ens. Der. 2016; (35): 25-33

Baltagi, B.H., (2005), *Econometric Analysis of Panel Data*, Third edition, Chichester: Wiley.

Barbieri, L., (2006), Panel Unit Root Tests: A Review. Quaderni del Dipartimento di Scienze Economiche e Sociali, Serie Rossa N. 43, Università Cattolica del Sacro Cuore, Piacenza.

Barney, J., (1991), Firm Resources and Sustained Competitive Advantage. Journal of Management, 17 (1), 99-120.

Belt, B., (1985), The Trend of the Cash Conversion Cycle and its Components, Akron Business and Economic Review, Fall 1985, pp 48-54.

Besley, S. and Meyer, R. L., (1987), An Empirical Investigation of Factors Affecting the Cash Conversion Cycle, presented at the Annual Meeting of the Financial Management Association, Las Vegas, Nevada.

Blinder, A. S., and L. J. Maccini., (1991), Taking Stock: A Critical Assessment of Recent Research on Inventories. *Journal of Economic Perspectives*, 5 (1): 73-96. DOI: 10.1257/jep.5.1.73

Bloomberg Essentials, 12.11.2019, Financial Statements of Turkish Firms That Listed in BIST100, Professional Services. <https://www.bloomberg.com/professional/>.

Boer, G., (1999), *Managing the cash gap*. *J. Accountancy*, 188: 27-32.

Bolak, M., (1998), *İşletme Finansı*, İstanbul: Birsen Yayınevi, 1998, s.31-33.

Boyacıoğlu, N., (2012), Sabit Varlık Yatırımlarının İşletme Sermayesi Yönetimine Etkisinin Panel Veri Analizi ile İncelenmesi: İMKB’de İşlem Gören İmalat İşletmeleri Üzerine Bir Uygulama, Yüksek Lisans Tezi, Mehmet Akif Ersoy Üniversitesi Sosyal Bilimler Enstitüsü, Burdur.

Brealey, R., Myers, S., & Allen, F. (2006), Working capital Management. In R. Brealy, S. Myers, & F. Allen, *corporate finance* (pp. 813-832). New York: McGraw-Hill.

Brigham, E. F. and Houston, J., (2014), *Fundamentals of Financial Management/Finansal Yönetimin Temelleri*, Çev. Nevzat Aypek, 7. Baskı, Ankara: Nobel Akademik Yayıncılık, 2014, s.101.

Büyükşalvarcı, A. and Abdioğlu, H. (2010), Kriz Öncesi ve Kriz Dönemlerinde İşletmelerde Çalışma Sermayesi Gereksiniminin Belirleyicileri: İMKB İmalat Sanayi Şirketleri Üzerine Ampirik Bir Uygulama, *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 24. Cilt, 2. Sayı, (2010): 47-71, s.49.

Brealey, R. and Myers, S., (1996), *Principles of Corporate Finance*, 3th ed. New York: McGraw-Hill.

Brigham, E. F.; Gapenski L. C. (1994), *Financial Management: Theory and Practice* 7th Edition. Japan. The Dryden Press. pp.697-701.

Brigham, E. F.; Gapenski, L. C., Ehrhardt, M. C (1999), *Financial Management: Theory and Practice* 9th Edition. Japan. The Dryden Press. pp. 791-896.

Breusch, T. S. and Pagan, A. R., (1980), The Review of Economic Studies Vol. 47, No. 1, Econometrics Issue (Jan., 1980), pp. 239-253 Published by: Oxford University Press DOI: 10.2307/2297111 <https://www.jstor.org/stable/2297111> Page Count: 15

Ceylan, A., (2006), *İşletmelerde Finansal Yönetim*, Ekin Kitabevi, Bursa.

Chakraborty, K., (2008), Working Capital and Profitability: An Empirical Analysis of Their Relationship with Reference to Select Companies in the Indian Pharmaceutical Industry, The Icfai Journal of Management Research.

Chambers, D.R. and Lacey, N.J., (1994), *Modern corporate finance: theory and practice*. New York, N.Y.: HarperCollins College Publishers, c1994. ISBN 0065010043.

Charitou M. S., Elfani M. & Lois P. (2010), The effect of working capital management on firm's profitability: Empirical evidence from an emerging market, *Journal of Business & Economics Research*, Dec. 2010, 8(12), 63-68.

Chen, H. L., (2011), An empirical examination of project contractors' supply-chain cash flow performance and owners' payment patterns, *International Journal of Project Management*, Vol. 29, pp. 604-14.

Cheatham, C., (1989), *Economizing on cash investment in current assets*. *Management Finance* (15(6): 20-25.

Christopher M. and Gattorna J. (2005), Supply chain cost management and value-based pricing, *Industrial Marketing Management*, Vol. 34, pp.115-21.

Choi, I., (2001), Unit Root Tests for Panel Data, *Journal of International Money and Finance*, 20, 249–272.

Collins, M.C. Saxena, A.K., and Wamsley, J. W., (1996); The role of insiders and divided policy; A comparison of regulated and unregulated firms, *Journal of finance and Strategic decision*, 9, 2898 – 3021

Coşkun, E. and Kök, D., (2011), Çalışma Sermayesi Politikalarının Karlılık Üzerine Etkisi: Dinamik Panel Uygulaması, *Ege Akademik Bakış*, Cilt: 11, Özel Sayı, ss. 75-85.

Cooper, B.J., Leung, P., Matthews, C., Carlson, P. Adapted by Mathews R. (1998), *Accounting and Finance for Managers. (New Zealand Edition)*. Australia: Jacaranda Wiley Limited.

Çakır, H. M., (2013), Sectoral Analysis of the Cash Conversion Cycle Effects on Firm Profitability, *Journal of Yasar University*, 30 (8), pp. 4948-4965.

Da Costa, B.R, (2014), Cash Conversion Cycle Across Industries, A Work Project, presented as part of the requirements for the Award of a Master's Degree in Management from the NOVA – School of Business and Economics.

Deloof, M., (2003), Does Working Capital Management Affect Profitability of Belgian Firms? *Journal of Business Finance & Accounting*, Vol. 30 N. 3 & 4, pp. 573-587.

Eljelly, A., (2004), Liquidity-Profitability Trade off: An Empirical Investigation in an Emerging Market, *International Journal of Commerce & Management*, 14 (2), pp. 48 – 61.

Emery, G.W., (1984), *Measuring short-term liquidity*, *J. Cash Manage.*, 4: 25-32.

Ercan, M. K. and Ban, Ü., (2009), *Değere Dayalı İşletme Finansı Finansal Yönetim*. 5. Baskı. Ankara: Gazi Kitabevi.

Erdoğan, M. (1990), *İşletme Finansmanı*, Diyarbakır: Dicle Üniversitesi Matbaası, 1990, s.72.

Erol, C., (1999), *İşletmelerde finansal yönetim*, Ankara: İmge Kitabevi, 1999.

Eviews Innovative Solutions, (2020), online downloaded from website on 17.06.2020.http://www.eviews.com/help/helpintro.html#page/content/advtimeser-Panel_Unit_Root_Testing.html.)

Fawcett S.E., Ellram L.M. and Odgen J.A., (2007), *Supply Chain Management: From Vision to Implementation*, Pearson Education Inc., Upper Saddle River, New Jersey.

Finnerty, J. D. (1993), An Overview of Corporation Securities Innovation. *Journal of Applied Corporate Finance*, 4, 23-39.

Foster Jr S.T. (2008), Towards an understanding of supply chain quality management, *Journal of Operations Management*, Vol. 26, pp. 461-67.

Gallinger, G.W. and Healey, P.B., (1987), *Liquidity Analysis and Management*. Reading, Massachusetts: Addison-Wesley Publishing Company.

García, P. J., Martínez, P., (2007) Effects of working capital management on SME profitability. *International Journal of Managerial Finance* 3, 164-177.

Gentry, James A., R. Vaidyanathan and Hei Wee Lee, (1990), A Weighted Cash Conversion Cycle, *Financial Management*, pp 90-99.

Gill, A., (2011), Factors that influence working capital requirements in Canada. *Economics and Finance Review* Vol. 1(3) pp. 30 – 40, ISSN: 2047 - 0401 Available online at <http://www.businessjournalz.org/efr>

Gill, A., Biger N. and Mathur N., (2010), The Relationship Between Working Capital Management and Profitability: Evidence from the United States, *Business and Economics Journal*, Vol. 2010: BEJ-10.

Gitman, L. A. (1997), *Principles of Managerial Finance: 7th Edition* New York;Harper Collins College Publishers. Pp. 684-710.

Güvemli, O., (1973), *Sanayi İşletmelerinde İşletme Sermayesi ve Analizi*. İstanbul: Kutulmuş Matbaası.

Hatibođlu, Z., (1986), *İřletme Finansı*, İstanbul: Met/Er Matbaası, 1986, s.252-253.

Hager, H. C., (1976), *Cash Management and Cash Cycle*, Management Accounting,57: pp 79-88.

Haresh B., (2012), Working capital management and profitability: Evidence from India – An empirical study, GFJMR, 5, July- Dec., 1- 66.

Hayes, A., (2019), Cash conversion cycle definition. Investopedia, Corporate Finance and Accounting, <https://www.investopedia.com/terms/c/cashconversioncycle.asp>

Helfert, E.A., (2001), The Financial Analysis: Tools and Techniques a Guide for Managers. McGraw-Hill Companies US Finance and Economics, 24, 186-193.

Hiçşmaz, M., (1977), *Bilanço ve Gelir Tabloları Analizi*. 3. Baskı. Ankara: A.İ.T.İ.A. Yayını.

IHS Markit, GDP Growth Rate for Turkey, quarterly based, <https://connect.ihsmarkit.com/data-browser/buildQuery/> - 16.06.2020.

Im K.S., M.H. Pesaran and Y. Shin (2003), Testing for Unit Roots in Heterogeneous Panels, Journal of Econometrics, 115, 53-74.

İřeri, M. and Chambers, N., (2003), Üretim ve Perakende Ticaret Sektörlerinin Nakit Dönüşüm Süreçlerinin İrdelenmesi, Mali Çözüm Dergisi, Sayı 62, s.2.

Jose, M. L., Lancaster, C. and Stevens, J. L., (1996), Corporate returns and cash conversion cycles, Journal of Economics and Finance, Vol. 20 No.1, pp. 33-46.

Kamath, R., (1989), How Useful Are Common Liquidity Measures? Journal of Cash Management, pp 24-28.

Karadagli, E. C., (2012), The Effect of Working Capital Management on the Profitability of Turkish SMEs. British Journal of Economics, Finance and Management Sciences, 5 (2): 36-44.

Karadeniz, E., (2012), Turizm Sektörünün Nakit Dönüşüm Süresinin Analizi: İMKB Turizm Şirketleri ve TCMB Sektör Bilançoları Üzerinde Bir Araştırma, Cag University Journal of Social Sciences, 9 (1), 122-145.

Karaduman, H. A., Akbas, H. E., Çalışkan, A. O., Durer, S., (2011), The Relationship Between Working Capital Management and Profitability: Evidence from an Emerging Market, International Research Journal of Finance and Economics, (62): 61-67.

Keskin, R., Gökalp, F. (2016), Çalışma sermaye yönetiminin firma karlılığı üzerine etkisi: Panel veri analizi. Doğu Üniversitesi Dergisi, 17(1), 15-25.

Khajeh, S. G., (2014), Bist Tekstil Deri Sektöründeki Firmalarda Çalışma Sermayesi Yönetiminin Firma Karlılığı Üzerine Etkileri. (Yayınlanmamış Y.L Tezi). Atatürk Üniversitesi, Erzurum.

Kuau H. V. & Sing S. (2013), Managing efficiency and profitability through working capital: An empirical analysis of BSE 200 companies, Asian Journal of Business Management, 5(2), 197-207

Lazaridis, I. and Tryfonidis, D., (2006), The Relationship between Working Capital Management and Profitability of Listed Companies in the Athens Stock Exchange, Journal of Financial Management and Analysis, Vol. 19 No.1, pp. 26-35.

Levin, A., C.F. Lin and C.S.J. Chu, (2002), Unit root tests in panel data: asymptotic and finite-sample properties, Journal of Econometrics, 108, 1-24.

Lyrouti, K., and Lazaridis, Y., (2000), The Cash Conversion Cycle and Liquidity Analysis of the Food Industry in Greece (June 2000). EFMA 2000 Athens. Available at SSRN: <https://ssrn.com/abstract=236175> or <http://dx.doi.org/10.2139/ssrn.236175>

Maddala, G. and S. Wu, (1999), A Comparative Study of Unit Root Tests and a New Simple Test, Oxford Bulletin of Economics and Statistics, 61, 631-652.

Majeed, S., Makki, M. A. M, Saleem, S., and Aziz, T., (2013), The Relationship of Cash Conversion Cycle and Profitability of Firms: An Empirical Investigation of Pakistani Firms. Journal of Emerging Issues in Economics, Finance and Banking (JEIEFB) An Online International Monthly Journal, 1 (1): 35-51 (ISSN: 2306 367X).

McMenamin, J., (1999), Study of Working Capital Policies and Fixed Assets in Financial Institutions in USA, ACC Research Report No. 89.

Miller, J. W., (1979), Working Capital Theory Revisited, The Journal of Commercial Bank Lending, pp. 15-31.

Miller, K.R Jm., (1991), The Importance of Good Cash Management. Business and Economic Review, 38 (1), October-December, 20-22.

Moss, J.D. and Stine, B., (1993), Cash conversion cycle and firm size: a study of retail firms, Managerial Finance, Vol. 19 No. 8, pp. 25-34. <https://doi.org/10.1108/eb013739>

Nazir M. and Afza T., (2009), Impact of Aggressive Working Capital Management Policy on Firm's profitability, The IUP Journal of Applied Finance, Vol. 15, Aug.

Napompech, K., (2012), Effects of Working Capital Management on the Profitability of Thai Listed Firms. International Journal of Trade, Economics and Finance, Vol. 3, No. 3.

Ng, C.K., Smith, J.K. and Smith, R.L., (1999), Evidence on the Determinants of Credit Terms Used in Interfirm Trade, Journal of Finance, Vol. 54, pp. 1109-1129.

Nobanee, H., and Al Hajjar, M. (2009), A Note on Working Capital Management and Corporate Profitability of Japanese Firms, Available at SSRN: <https://ssrn.com/abstract=1433243> or <http://dx.doi.org/10.2139/ssrn.1433243>

Omağ, A., (2009), Gıda Sektöründe Nakit Dönüşüm Süresi Analizi: Türkiye ve Amerika Birleşik Devletleri Örneği, Maliye Finans Yazıları, Yıl: 23 Sayı:83, s.45.

Öztanır, İ., (2015), Çalışma Sermayesi Yönetimi ve Firma Performans Göstergeleri Arasındaki İlişkinin Bist İmalat Sektöründe Araştırılması, (Yayınlanmamış Yüksek Lisans Tezi, Pamukkale Üniversitesi SBE, 2015), s.54-55.

Pandey, I., (1993), *Financial Management*, 6th ed, Vikas Publishing House, New Delhi

Pavlis, Nikolaos E, Socrates J. Moschuris, and Lambros G. L., (2008), Supply Management Performance and Cash Conversion Cycle, International Journal of Supply and Operations Management, University of Piraeus, Piraeus, Greece.

Pedro J. G. & Pedro M., (2007), Effects of working capital management on SME profitability, International Journal of Managerial Finance, 2(2), 164-179, <http://papers.ssrn.com/sol3/papers.cfm>

Phillips, A.L., (1997), Treasury management job responsibilities, curricular development, and research opportunities. Financial Management, 26 (3), 69-81

Pinches, G.E., (1992), Essentials of Financial Management. 4th Edition, HarperCollins Publishers, New York, ISBN: 0-06-500450-7.

Raheman, A., and Nasr, M., (2007), Working Capital Management and Profitability Case of Pakistani Firms. International Review of Business Research Papers 3. Cilt.1. Sayı. 279-300.

Raheman, A., Qayyum, A., Afza, T, Bodla M.A., (2010), Sector-wise analysis of working capital management and firm performance in manufacturing sector of Pakistan. Interdiscip J Contempt, Res Rus 2(7): 412-437.

Rehn, Eric. (2012), Effects of Working Capital – Management on Company Profitability, MsC thesis, Hanken School of Economics.

Rezazadeh, J. and Heidarian, J., (2010), The effect of working capital management on profitability of Iranian companies. Accounting Research, v. 89 (7), p.20-28.

Richards, Verlyn. D. and Eugene J. Laughlin, (1980), A Cash Conversion Cycle Approach to Liquidity Analysis, Financial Management, Spring 1980, pp 32-38.

Rimo, A., and Panbunyuen, P., (2010), The effect of company characteristics on working capital management: A quantitative study of Swedish listed companies.

Sakarya, Ş., (2008), Nakit Yönetiminde Nakit Dönüş Süresi Analizinin Kullanılması: İMKB'deki KOBİ'ler Üzerine Amprik Bir Çalışma, Süleyman Demirel Üniversitesi, İktisadi ve İdari Bilimler Fakültesi Dergisi, C.13, S.2 s.227-248.

Samiloglu, F. and Demirgunes K., (2008), The Effect of Working Capital Management on Firm Profitability: Evidence from Turkey. *The International Journal of Applied Economics and Finance*, 2: 44-50.

Scherr, F.C. (1989), *Modern Working Capital Management: Text and Cases*. Englewood Cliffs: Prentice Hall, 469p.

Schilling, G., (1996), Working capital's role in maintaining corporate liquidity. *TMA J.*, 16: 4-7.

Shin, H.-H., & Soenen, L., (1998), Efficiency of Working Capital Management and Corporate Profitability. *Financial Planning and Education*, Vol. 8 (2), 37-45.

Stadtler, H., (2005), Supply chain management and advanced planning—basics, overview and challenges, *European Journal of Operational Research*, 163(3), 575-588.

Summers, B. and Wilson, N., (2000), Trade Credit Management and the Decision to Use Factoring: An Empirical Study, *Journal of Business, Finance and Accounting*, Vol. 27 No.1 & 2, pp. 37-68.

Vijayakumar A. (2002), Determinants of corporate size, growth and profitability- The Indian experience, in the book *Research Studies in Commerce and Management*, Classical Publishing Company, New Delhi, 66-74.

Wang, Y-J. (2002), Liquidity management, operating performance, and corporate value: evidence from Japan and Taiwan, *Journal of Multinational Financial Management*, Vol. 12, pp.159-69.

Takon, S. M., (2013), Does Cash Conversion Cycle Have Impact on Return on Assets of Nigerian Firms? *Research Journal of Finance and Accounting*, 4 (14): 34-42. ISSN 2222-1697 (Paper) ISSN 2222-2847 (Online).

Tangsuecheeva R. and Prabhu V., (2013), Modeling and analysis of cash-flow bullwhip in supply chain, *International Journal of Production Economics*, Vol. 145, pp.431-47.

Teruel, P.J.G. and Solano, P.M., (2007), “Effects of Working Capital Management on SME Profitability”, *International Journal of Managerial Finance*, Vol. 3 No.2, pp. 164-177.

Tükenmez, M.- Susmuş, T.- Özkan, S. – Kutay, N.- Evrim, P.- Baklacı, H. F.- Yücel, T.- Özkol, E.- Durukan, M. B.- Yükçü, S., (1999), *Finansal Yönetim*, Vizyon Yayınları, Ankara. s.389-390.

Uluyol O., Türk V.E., (2013), *Finansal Rasyoların Firma Değerine Etkisi: Borsa İstanbul (BİST)’da Bir Uygulama*”, *Afyon Kocatepe Üniversitesi İİBF Dergisi*, 15(2), 365-384.

Warnes, S. (2013), *Impact of Working Capital Management on Firm’s Profitability: Empirical Evidence from Cement Sector (A Case study of Pakistani Firms)*. *American Journal of Governance and Politics* 3 (2): 46-55. ISSN (Paper) 2568-5236 ISSN (Online) 2568-5597.

Wongthatsanekorn, W., (2010), *Study of Cash-to-Cash Cycle Management on Profitability of Private Hospital in Thailand by Regular and Panel Data Regression Analyses*. *Lecture Notes in Engineering and Computer Science*. 2187.

Yazdanfar D. and Ohman P., (2014), *The impact of cash conversion cycle on firm profitability: an empirical study based on Swedish data*, *International Journal of Managerial Finance*, Vol. 10, pp. 442-52.

Yılmaz, H., (2004), *Şirket Performans Yönetimi: Yeni Çevrede Karlılık ve Büyümenin Yönetimi, İş, Güç Endüstri İlişkileri ve İnsan Kaynakları Dergisi*, 6.

Yücel, T. and Kurt, G., (2002), *Nakit Dönüşüm Süresi, Nakit Yönetimi ve Karlılık: İMKB Şirketleri Üzerinde Ampirik Bir Çalışma*”, *İMKB Dergisi*, Cilt 6, Sayı 22, s. 1-15.

ANNEX-1 CURRICULUM VITAE

PERSONAL INFORMATION

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Nationality : T.C.
Birth Date - Place : 02/08/1983 - Samandag
Marital Status : Married
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EDUCATION

DEGREE	INSTITUTION	GRADUATION YEAR
Bachelor's	Karadeniz Technical University	2006
High School	Samandag High School	2000

WORK EXPERIENCE

YEAR	NAME OF ORGANIZATION	TITLE
2019- Present	GSATCOM UZAY TEKNOLOJİLERİ A.Ş.	Chief Financial Officer
2018- Present	TÜRK HAVACILIK ve UZAY SANAYİİ A.Ş.	Manager, Budget and Industrial Accounting
2015-2018	GAMA GÜÇ SİSTEMLERİ A.Ş.	Manager, International Trade and Export Finance
2011-2015	ÇALIK ENERJİ A.Ş.	Manager, Business Development
2010-2011	RÖNESANS HOLDİNG	Manager, Supply Chain
2009-2010	ENKA TEKNİK A.Ş.	Chief, Supply Chain
2006-2008	TMG MADENCİLİK	Geology Engineer

FOREIGN LANGUAGE:

Advance ; English
Native ; Arabic

HOBBIES:

Digital Transformation, Traditional Agricultural Practices, Reading.