

**IMPACT OF WORKING CAPITAL MANAGEMENT ON
PROFITABILITY OF CHEMICAL SECTOR OF PAKISTAN**

By

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MBA Thesis

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LIST OF ABBREVIATION

Sr.no.	Abbreviations	Full forms
1	KSE	Karachi Stock Exchange
2	WCM	Working Capital Management
3	ARM	Accounts Receivable Management
4	APM	Accounts Payable Management
5	IM	Inventory Management
6	ROA	Return On Assets
7	CPPNM	Convention Physical Protection of Nuclear Material
8	BTWC	Biological and Toxins Weapons Convention
9	CWC	Chemical Weapons Convention
10	OPCW	Organization for the Prohibition of Chemical
11	NSC	Nuclear Safety Convention

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ABSTRACT

Purpose of the study: The purpose of this study is to find the effect of working capital components that is (collection period, payment period and inventory period), liquidity and firms' size over profitability of chemical firms in Pakistan. The study evaluates the individual impact of independent variables on ROA.

Research method: Research approach for this study is Cause and Effect approach. The nature of the research is explanatory. Collection period, inventory period and payment period are the independent variables of the research whereas Return on assets is the only dependent variable of the research. The secondary data has been taken from the audited annual financial reports of five years from 2009 to 2013. The hypothesis are made to indicate the impact of collection period on ROA, the impact of inventory period on ROA, the impact of payment period on ROA as well as the impact of liquidity and firms' size on ROA.

Findings of the research: The results of the hypotheses reveal that there is inverse relationship between collection period, inventory period and payment period with return on assets. Liquidity and firms' size have positive impact on return on assets.

Practical implications of the research: The findings of the research indicates that there is negative relationship between independent and dependent variables so it is crucial for chemical firms and financial managers to investigate the relationship between these working capital management variables with return on assets to reduce the collection and payment period and by keeping inventory to optimum level so that firms can perform better to generate more profits.

Keywords: Working capital management, collection period, payment period, inventory period, current ratio, return on assets.

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Chapter 1

INTRODUCTION

1.1 Problem Background

Working capital is fundamental for improving financial position of companies through efficient management of working capital components which includes inventories accounts receivable, accounts payable, cash and ratio analysis. Mostly companies get failed to run their business operations smoothly because of poor working capital management. As the main objective of firms' success comprehensively relies on how frequently firms are capable to convert working capital components into liquid so that firms could fulfill their short term debt obligations and reduce operating expenses.

1.2 Problem Statement

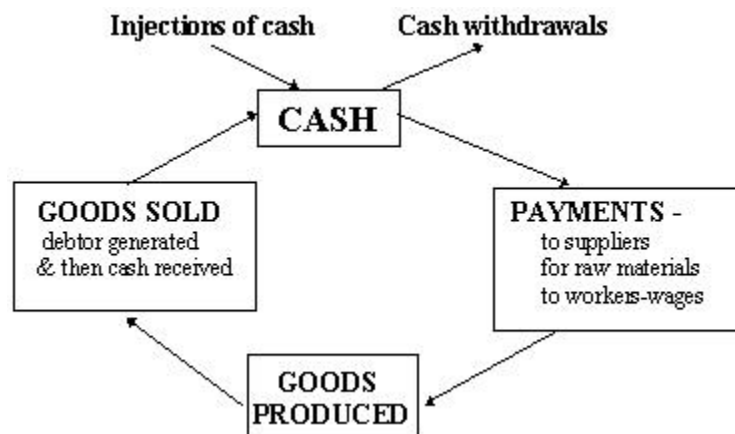
Key components of working capital are collection period, payment period and inventory period. These factors influence profitability of firms as per the previous studies. Furthermore, some financial managers ignore the impact of operating cycle by increasing debtors' collection period and decreasing creditors' payment period. All these mismanagement creates problem for the company to investigate, hence there is need to study the relationship between working capital and profitability of chemical sector in Pakistan. Further it will also be examined that whether firm size and current ratio have impact on chemical firms' profitability.

1.3 Working Capital Management

Working capital is described as current assets minus current liabilities. Companies' main objective is to earn high profit margin through implementation of working capital management system effectively and efficiently. There are two aspects of managing working capital one is ratio analysis and other is components of working capital separately.

Fundamental ratios for evaluating financial performance of working capital management system are working capital ratio, collection ratio and inventory ratio. By measuring ratio analysis which assists firms in order to identify other aspects such as cash management, accounts receivable management, accounts payable management and inventory management.

WORKING CAPITAL CYCLE



1.4 Chemical firms of Pakistan

Chemical sector contributes significant role to the economic stability and development of any country. The global chemicals industry is the largest manufacturing industry with sales of \$ 2.5trillion in 2010. Unfortunately Pakistan's chemical industry is facing pressures from global competitive markets. The main competitors in chemical sector are from Western Europe, Japan and USA whereas emerging players are China, Eastern Asia and Eastern Europe. According to the recent surveys, Western Europe is being considered leader in chemical industry globally which has share of 36% of total chemical sales.

Policy makers of Pakistan are trying to boost the industry of chemical gradually although firms of chemical sector possess less profitable but better developed commercial chemical sector as compared to India's chemical firms. According to the trade policy of Pakistan in 2010, chemical industry would be dominant in the sector of technology, biotechnology and telecommunications. Therefore it helps in making huge collection of consumer goods with having contribution in agriculture, manufacturing, construction and services sectors. Moreover, the importance of chemical industry reveals major essence particularly in manufacturing sector all over the world because chemical firms are considered as elemental component regarding manufacturing sub sectors and also includes other sectors as well such as automobiles, textiles, pharmaceuticals, electronics, construction and appliances.

Presently, financial managers of chemical firms of Pakistan are playing important role in relation to integrated approach. For this policy makers of Pakistan are bringing together traders, research and development and production partners for improving the chemical sector on the whole. Because it will assist in promoting innovation to enhance the chemical sector which evaluates result in quantitative and qualitative of chemical goods.

Several international agreement and conventions concerning chemical industry development have been signed by Pakistan such as in 1994 Nuclear Safety Convention (NSC) was signed

in case of Nuclear Accident as early Notification another for Nuclear or Radiological Accident as Assistance. Additional were announced in 1972 but ratified in 1997 which were Convention Physical Protection of Nuclear Material (CPPNM), Biological and Toxins Weapons Convention (BTWC). In 1993 Chemical Weapons Convention (CWC) was introduced but approved in 1997 and now it is a member of Organization for the Prohibition of Chemical Weapons (OPCW) productively.

1.5 Reasons Affecting Working Capital Needs

The aspects which influence the working capital requirements for firms are categorized as two factors one is internal factors and other is external factor by which financial managers of chemical industry can make better decisions in order to enhance revenue for chemical firms.

Following are the reasons for fulfilling the needs of working capital for chemical companies in different conditions.

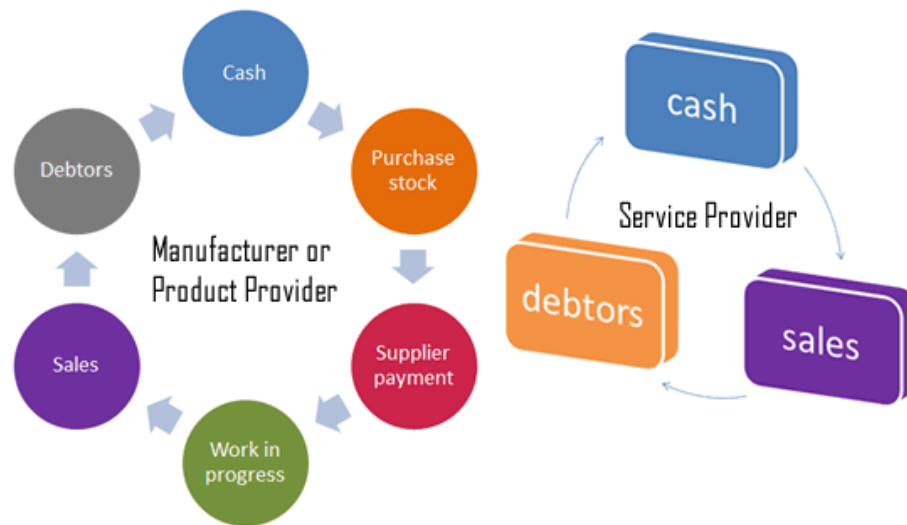
1.5.1 Internal factors

Following factors are evaluated by companies when influencing the working capital requirement for a particular time frame. Given variables are explained in details.

1.5.1.1 Nature of business

Type of business that firms possess also has impact on the working capital requirement. This factor indicates that the firms of manufacturing and trading business will keep more stocks

and have many trade debtors but contradictory these might be funded by short term debt obligations and trade payables. On the other hand service industry for instance restaurant or hotel has cash sales but a smaller trade debt amount. The result shows that restaurant may have minimum working capital than manufacturing companies.



1.5.1.2 Size of business

Smaller companies will not have sufficient amount to finance their working capital needs, as lenders don not provide money to those firms which have less credibility to pay their debts. Hence firms with smaller in size will lead to less level of working capital. However, firms with larger size may have high turnover and huge earnings which enhance growth movement of such firms as they have optimum holding stocks and low debtors period.

1.5.1.3 Production Policy of firms

There are two main policies of production such as steady policy that means firms have steady working capital needs during the period. Another one is seasonal policy which means that firms will increase their production in the high sales period therefore requirement of working capital will be high during this period.

1.5.2 External factors

Managers do not have any control over external factors which are determined by the environment.

1.5.2.1 Economic and Business Seasonal cycle

Many companies are realizing variations in demands by their customers this may be due to seasonal products and services. For this reason firms experience imbalances in their business operations which eventually influence the requirement of working capital. When economy is being improved that means demand for the goods will rise thus in resulting sales will also be increased due to which companies will take decision about the investment in their finished goods ultimately short term debts and debtors collection will also increase. If cash balance occurs then firms frequently receive long term debt and high earnings in order to finance in their fixed assets. However, when there is declining in the economic growth then eventually sales will decrease then companies will moderate their short term borrowings and have minimum debtors.

1.5.2.2 New technologies and new products

Manufacturing companies may secure their production but cash operating cycle will be reduced when firms come up with innovation in their technology division. Even though companies need heavy investment with the aim of introducing new products and technologies.

1.5.2.3 Policy of Taxation

Firms' working capital requirement also depends on taxation system because taxation policy determines companies that how much tax has to be paid. Therefore when business climate of country is progressive for investment perspective there is chance for firms to pay low tax rates which indicates that firms will not be in burden to pay tax. But this is not usual case for companies. Because mostly taxation policy makers put pressure on firms to pay tax immediately before quarterly financial period of companies that is why companies have to borrow cash for paying tax if cash is inadequate in debtors. As a result policy of taxation is suffering factor for most of the companies in upholding working capital cycle.

1.6 Working Capital Components

1.6.1 Accounts Receivable Management

When companies sell out their goods on credit it is recorded as account receivable in the balance sheet. Accounts receivable is recorded in the form of operating lines of credit which is due to collect within short time period approximately of one year or less than one year.

Companies maintain the requirement of receivable by initiating credit policy given to buyer so that buyer does know when to pay.

Companies analyze the credit in order to evaluate whether the buyer is paying on time or not. Furthermore, firms with shorter collection period will have sound financial performance because firms have ability to sustain their working capital needs.

1.6.2 Inventory Management

Inventory is considered crucial component of working capital. Inventory represents in income statement as work in progress, finished goods or raw material. When firms have less stocks that means if firm gets fail to meet its customer demand immediately which declined the earning of firms. But on contradictory firms with high holding inventory will have obsolescence stocks as well as opportunity cost.

1.6.3 Accounts Payable Management

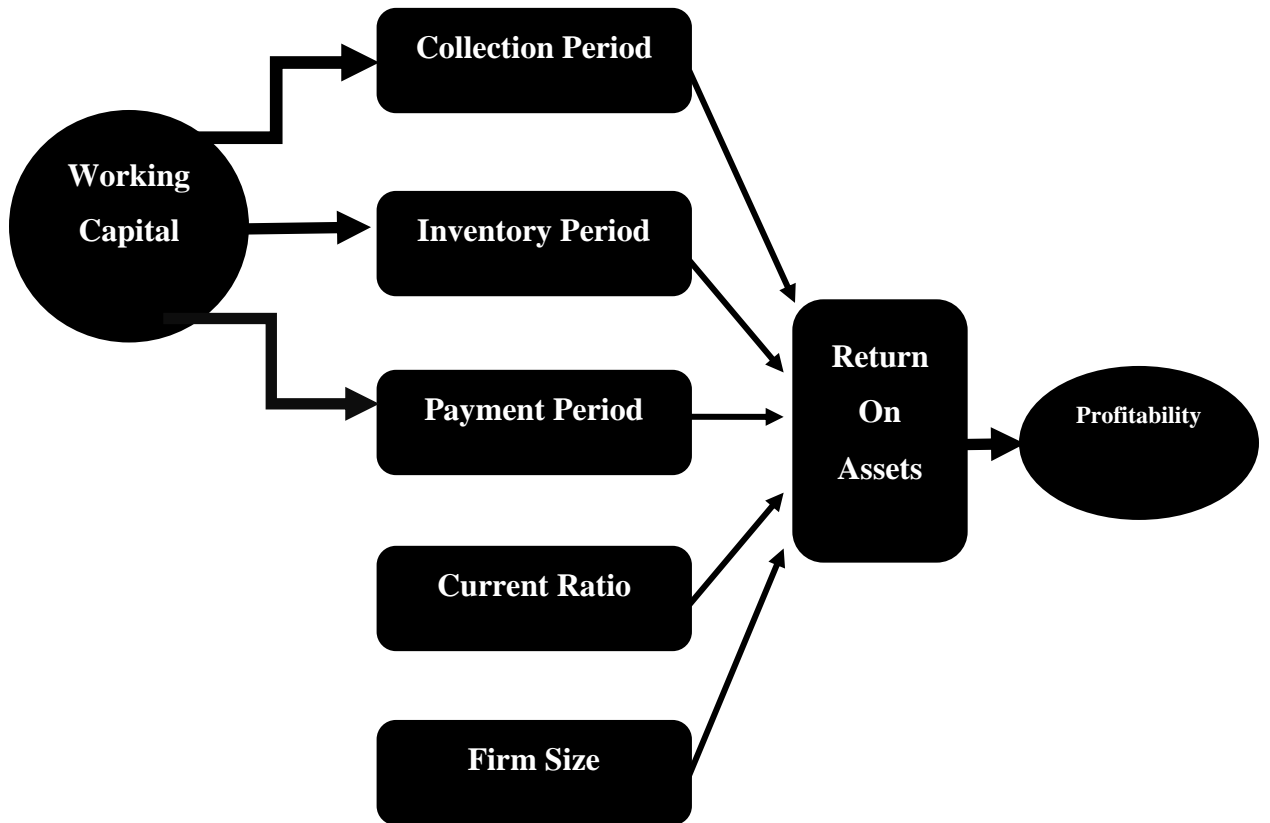
Accounts payable indicates liability that is evaluated from credit sales. Firms which purchase goods on credit and recorded as liability that has to be paid. Companies can avail benefit of credit policy on the basis of good terms with suppliers. Firms must evaluate that whether their suppliers are collecting payment within given time period or not in order to satisfy the creditors.

1.7 Purpose and Importance of Research

The purpose of this study is to evaluate the effect of working capital components that is collection period, inventory period and payment period on chemical companies' profitability listed on Karachi Stock Exchange. Moreover, this study also finds out the impact of liquidity that is current ratio and firm size over profitability of listed chemical companies. This research will be useful in giving knowledge regarding management of working capital and profitability. Moreover from the perspective of maximization relating to shareholders wealth by evaluating working capital components effect on profitability. Lastly findings of this research will assist chemical companies to improve their financial performance through proper consideration of working capital. Various studies have been conducted to test the relationship of working capital management with profitability.

As per the reasons it is necessary to find relationship between working capital components which are collection period, payment period and inventory period as well as with liquidity and size of firm over profitability. This research will assist financial managers in making better decision regarding working capital component over profits of chemical firms.

1.8 Conceptual Framework



1.9 Hypotheses

Hypothesis 1: Collection Period has effect on ROA of chemical firms

Hypothesis 2: Inventory Period has effect on ROA of chemical firms

Hypothesis 3: Payment Period has effect on ROA of chemical firms

Hypothesis 4: Current Ratio has effect on ROA of chemical firms

Hypothesis 5: Firm Size of firm has effect on ROA of chemical firms

1.10 Thesis Time Horizon

This research is cross sectional-sectional research because it is conducted in limited time period. The secondary data was collected of the research in the month of March and April 2015. The work on this thesis was started in February 2015 and completed in May 2015.

1.11 Thesis Time Scale

October to November 2014: Topic was selected

December 2014: Proposal was submitted by the end of this month.

March 2015: Study of Literature

March 2015: Critical Literature Review and Questionnaire

March to April 2015: Data was collected

April to May 2015: Data Integration and Critical Debate

May 2015: Conclusion as per the results and Recommendations of this research

1.12 Limitation of This Study

Following limitations are defined of this study:

- Time frame for this research was limited. If time was not limited then more aspects might be explored with more details of this study.

- For conducting this study other factors have been considered constant. Thus any variation in any factor might create change in the implication of this study.

1.13 Prospects of Further Research

This research depicts limited sample size specifically of Chemical sector and used selected accounting measures for dependent and independent variables but for fulfilling the objective outcomes, further researches should be analyzed by taking additional accounting factors and other sectors with large sample size which do impact on working capital management and to evaluate how firms can perform better through proper management of working capital.

1.14 Organization of the Thesis

The thesis consists of six chapters, a list of references / bibliography and appendices.

Chapter 1 constitutes the problem background, aim of the research, research hypotheses and objectives and introduction to the organization/sector over which the research is being conducted etc.

Chapter 2 provides critical review of the existing literature containing the critical academic debate about (the topic) with the views of the academicians' and practitioners' on the matter.

Chapter 3 provides information on research methodology – nature and kind of research, sample size, sampling method, data collection methods employed during the study, kind of data collected, and the way the data is integrated

Chapter 4 includes research data of both kinds – primary as well as secondary – collected and integrated. It will also show findings of the data and their interpretation and analysis.

Chapter 5 provides a critical debate on the study drawing on the literature review and contrasting it with the findings of this study.

Chapter 6 constitutes conclusion and recommendations of the study.

CHAPTER 2

LITERATURE REVIEWS

2.1 Literature

Following are the previous researches which have been conducted before this research regarding working capital management effects over profitability of firms from other perspectives and scenarios.

Ali (2011) attempted to look on the impact of working capital management on profitability of textile sector of Pakistan. In order to test the efficiency of working capital the variable were used such as cash conversion efficiency, days operating cycle and days working capital. Whereas return on asset, economic value added, return on equity and profit margin on sales were indicators used for examining profitability. Sample size of 160 textile companies were used for 6 years from 2000 to 2005. Ordinary least square and fixed effect model has been used. The results were found that there was negative relation between return on assets, average day's receivable and average day's payables but positive relation between average inventory and return on assets. Moreover the results revealed that the positive relationship between return on asset and cash conversion cycle would be more cost effective for textile firms.

IkramulHaq, Sohail, Zaman, and Alam (2011) selected 14 firms from cement industry in Pakistan. The period covered for the study was 2004 to 2009. They used receivable days, payable days, inventory days, current ratio, liquid ratio and current assets to total assets ratio to predict the behavior of the return on investment. Regression analysis and correlation

analysis are used to measure the relationship between the variables. Finally it is concluded that the relationship between these variables and return on investment is moderate.

Danuletiu (2010) explored the effect of working capital management and profitability of firms in Alba County. Pearson Correlation model was used for estimation. Financial data was gathered by sampling of 20 companies. The study covers the period of 5 years from 2004 to 2008. Different working capital indicators were used and firms are divided on the basis of defensive and offensive policy. In conclusion it was found that there was negative relation of working capital ratios with profitability.

Dong (2010) studied that working capital management is negatively related to profitability of selected listed companies on Vietnam Stock Exchange. The period covered for the study was 2006 to 2008. Research was mainly based on the relationship between working capital components and cash conversion cycle. The study finds that there is negative relationship between the cash conversion cycle and profitability. Results indicated that companies have better financial position because of reducing receivable days and inventory days to the minimum level.

Gill and Mathur (2010) found positive effect of cash conversion cycle over financial performance of USA firms. Moreover, it was also found that a highly substantial negative relationship between accounts receivables and firms' financial performance. He came up with the conclusion that profit margins could be increased through maintaining working capital to a minimum level. For the reason that firms with low profits would likely to decline their accounts receivables in order to keep their cash gap less in cash conversion cycle.

Uyar (2009) investigated the relationship between profitability, firm size, the cash conversion cycle for the companies listed in Istanbul Stock Exchange. Correlation and Anova tools were used for estimation. The result was found cash conversion cycle of manufacturing sector was higher than whole sale industry. Moreover there were negative relation of firm size and profitability with cash conversion cycle.

Samiloglu and Demrtgunes (2008) in their study discovered the determinants of companies' profitability through variables in relating to practices of working capital management. The sample is used of Turkish manufacturing industry from the period of 1998 to 2007. The results indicated that account receivable period, inventory period and leverage are significantly positive. In addition to evaluate the effect of but leverage is considered effective variable on profitability in a negative manner.

Ganesan (2007) studied relationship between the efficiency of working capital management and profitability and liquidity of telecommunication industry in USA. The selected listed telecommunication companies were 349 out of 443 from financial year 2001-2007. The variables were Days of Working Capital (DWC), Operating Income plus depreciation denoted as Total Assets (IA), Operating Income plus depreciation denoted as Sales (IS), Cash Conversion Efficiency (CCE), Current Ratio (CR), Days Sales Outstanding (DSO), Days Inventory Outstanding (DIO) and Days Payable Outstanding (DPO) whereas IS and IA were used for measurement of profitability and analyzed by correlation and regression model. The study finds that there is negative relationship between IA and DWC. He observed the negative association between IS and DWC, DSO, DIO and DPO as well. Thus, working capital management efficiency moves in opposite direction to profitability and liquidity. On the basis of the study he suggested that reduction in inventory and improvement in DPO by receiving credit from suppliers could improve working capital management efficiency.

Raheman and Nasr (2007) investigated the impact of working capital management over liquidity as well as profitability of 94 listed companies as sample on Karachi Stock Exchange in Pakistan for the period of 6 years from 1999 to 2004. They studied the relationship between different variables of working capital management and the Net operating profitability of listed Pakistani firms. They used Debt ratio, size of the firm which were measured in terms of natural logarithm of sales and financial assets to total assets ratio as control variables. By using Pearson's correlation, and regression analysis (Pooled least square and general least square with cross section weight models) they observed a strong negative relationship between variables of the working capital management and profitability

of the firm. Moreover, there was substantial negative relationship between liquidity and profitability but a positive correlation between size of the firm and the profitability. In conclusion significant negative relationship between debt and profitability is found.

Padachi (2006) studied on small manufacturing firms to analyze the relation between working capital management and profitability. For this study he examined sample of listed manufacturing firms of Mauritius for the period of six years from 1998 to 2003. Days of receivable, inventory turnover, cash conversion cycle and payable days as independent variables while return on total assets as dependent variable. Regression analysis is used for finding results. The outcome was paper and printing industry had greater proportion than manufacturing industry due to which profitability of this industry is positive. But also found that heavy investment in account receivables and inventory would minimize the profitability of firms.

S.M.AmirShah and Aisha Sana (2006) investigated association between working capital and the profitability of listed companies of Oil and Gas sector of Pakistan during 2001-2005. They used working capital ratios including inventory turnover, receivables ratio, payables ratio, current ratio, quick ratio, and cash conversion cycle. Correlation and OLS method using Fixed Effect Estimation model were performed. The result of study shows that gross profit margins move in opposite direction to number of days' inventory, number of days' accounts receivable, cash conversion cycle and sales growth. Whereas gross profit margin has positive effect on accounts payable conversion period. Hence they concluded that there is possibility of maximizing returns for shareholders while managing the working capital efficiently.

Eljelly (2004) explained that controlling as well as planning of current liabilities and current assets is needed for managing the liquidity in an efficient manner so that the risk of inability to meet short term obligations could be eliminated. He conducted research of joint stock companies in Saudi Arabia in order to find the relationship between liquidity and profitability by examining cash conversion cycle and current ratio. In this study, correlation and

regression analysis were performed. The result found that cash conversion cycle is more reliable for measuring liquidity than current ratio which have significant effect over profitability. Another variable that is size has also influence on profitability at business level. The size variable was found to have significant effect on profitability at the industry level. The results were found inverse relationship between profitability and liquidity dimensions for instance cash gap and current ratio of Saudi Arabia's sample companies. Furthermore, regarding to measurement of liquidity it was indicated that there was excessive unlikeness among industries.

Deloof (2003) analyzed 1009 nonfinancial firms of Belgian during 1992–96, to identify the impact of working capital management on profitability of Belgium firms'. Tools of analyses to test the data were correlation and regression, he found negative relationship among gross operating income, average days accounts receivable, average days in inventory, average days accounts payable. Results indicated that managers may likely generate worth for shareholders by way of keeping optimum level of inventory and declining the average days of accounts receivable. Lastly, negative relationship between accounts payable and profitability shows that firms with minimum amount of revenue wait longer to pay the bills. He also studied that accounts receivable have extremely significant negative relationship with profitability.

Ghosh and Maji (2003) conducted research for the efficiency of working capital management of Indian cement firms for the duration of 1992–1993 to 2001–2002. Working capital management, performance, utilization, and overall efficiency indices were computed instead of evaluating common ratios of working capital management. They adjusted industry standards as target efficiency levels in order to examine the rapidness of efficiency for achieving that target level through individual firms during the period of study. Eventually, the result of entire Indian Cement Industry performance was not remarkable.

Wang (2002) conducted significant study over the relationship between operating performance and liquidity management. Furthermore, he also investigated about the impact of liquidity management on corporate value for companies in Japan and Taiwan. The study

revealed inverse relation between cash conversion cycle, return on equity and return on assets which also indicated delicate to industry aspects. Even though financial system and structural characteristics of both countries were not similar but aggressiveness of liquidity management improved the performance which also indication of increasing corporate value for firms in Taiwan and Japan.

Hyun-Han Shin and Luc Soenen (1998) emphasized that efficient Working Capital Management (WCM) had a substantial effect over corporate profitability and shareholders' wealth. They studied on large sample of 58985 listed firms in America for the period of 20 years from 1975-1994. They found that firms' net trade cycle is negatively related with firms' profitability.

Chapter 3

RESEARCH METHODOLOGY

3.1 Nature of Research

This research is cause and effect approach; the hypotheses were based on variables and secondary data was taken. The purpose of making hypotheses is to evaluate the impact of working capital on profitability of listed chemical firms in Pakistan, the impact of Collection period on ROA, the impact of inventory period on ROA, the impact of payment period on ROA and also find out the effects of liquidity as well as firm size over ROA. Hypotheses are rejected and accepted on the basis of data analysis.

The research type for this specific study is explanatory research. Dependent variable of this study is Return on assets which has been selected on the basis of previous research. Independent variables are collection period, payment period and inventory period. Furthermore, control variables are current ratio and firm size for this research. The effect of independent variables as well as control variables on dependent variables are found out on this research. Quantitative data has been used for this research.

3.2 Sample size

The periods covered for this study extends to five years from 2009 to 2013. The reason for taking this period of this study was that the financial information was available for investigation. The sample size is 15 chemical firms of Pakistan listed on KSE and companies which have financial information of trade debt, trade credit, inventory and net income were included.

3.3 Data Collection

Secondary data was used for this research as the data was taken from Karachi Stock Exchange (KSE) and official websites of chemical firms in Pakistan. The audited annual reports of Pakistani chemical firms have been taken. Only those financial information was gathered which had data of variables such as collection period, payment period, inventory period, current ratio, firm size and return on assets.

3.4 Research Variables

After a thorough study of literature review following variables are selected to test and examine the analyses of hypotheses of the research topic.

3.4.1 Dependent variable

Various measurements has been used for evaluating the profitability of firms among the researchers who studied the relation between working capital management and firms'

profitability. But mostly Return on assets is used as it is simplest variable which is shown in the working capital researches of Wang (2002), Samiloglu and Demirgunes (2008), Ali (2011). As stated by Padachi (2006) Return on Assets is a good measurement for firms' profitability because it indicates the profitability of firm with its assets which is calculated as:

$$\text{ROA} = \text{Net Income} / \text{Total Assets}$$

3.4.2 Independent variables

1st Variable CP is denoted as Collection Period

$$\text{CP} = (\text{trade debt} * 365) / \text{Net sales}$$

Account receivable is used to evaluate how long companies are taking to collect Trade debt from their debtors. A shorter debtor's collection period is an indication of increasing efficiency.

2nd Variable PP is denoted as Payment Period

$$\text{PP} = (\text{Trade Credit} * 365) / \text{Cost of sales}$$

Accounts Payable payment period shows the creditworthiness of the company. As it shows how much time is taken by the company in making payments to its creditors. Shorter payment period indicates positive sign but company should take full benefit of credit terms allowed by suppliers.

3rd Variable IP is denoted as Inventory Period

$$\text{IP} = (\text{Inventory} * 365) / \text{Cost of Sales}$$

It determines how many times inventory is sold and replaced by the company over given period of time. Holding cost of inventory increases inventory days which is not good sign for the company as it obsoletes stock.

3.4.3 Control variables

1st Variable CR is indicated as Current ratio

It is used to measure liquidity of the company that evaluates the ability of firms to pay its current liabilities with its current assets. It is calculated as:

CR=current assets/current liabilities

2nd Variable FS is indicated as Firm Size

Firms' size affects the profitability of firms as if a larger size firms have edge over smaller size firms as firms with large size have bargaining power by suppliers in a good form as well as lenders will like to provide loans to such firms. For the measurement of firms' size, natural logarithm of assets is not used by many researchers but widely used measurement is natural logarithm of sales which is shown in the working capital researches of Dong and Su (2010), Deloof(2003) and Raheman and Nasr (2007). In this research following formula was used:

Size= Natural logarithm of sales

3.5 Regression Model

$ROA = \alpha + \beta_1 CP + \beta_2 IP + \beta_3 PP + \beta_4 CR + \beta_5 FS$

Chapter 4

DATA INTEGRATION AND ANALYSIS

4.1 Data Integration

This chapter depicts data analysis after collecting data from listed companies in Karachi Stock Exchange (KSE) with the help of statistical tool that is Eviews. This chapter will represent the interpretation of results and nature of relationship between working capital management and profitability will be evaluated. Sample size was 15 KSE listed chemical companies and financial data was taken from audited annual reports of these selected companies.

4.2 Analysis

4.2.1 Table 1: Descriptive statistics

	ROA	CP	IP	PP	CR	FS
Mean	9.954135	37.76417	85.76022	92.18024	1.444393	15.30442
Median	6.337729	30.08346	59.67811	44.01043	1.144818	15.13775
Maximum	46.67544	144.8272	669.7941	794.2799	6.460201	17.86864
Minimum	-2.744283	0.609837	9.553959	0.407193	0.308190	12.16178
Std. Dev.	9.888316	31.30476	98.99660	140.3445	0.984604	1.306135
Skewness	1.515354	1.081092	3.779397	3.494251	2.251749	0.104071
Kurtosis	5.846821	4.065745	20.27535	16.83956	10.57684	2.323035
Jarque-Bera Probability	54.02994 0.000000	18.15891 0.000114	1111.166 0.000000	751.1642 0.000000	242.7813 0.000000	1.567516 0.456687
Sum	746.5601	2832.313	6432.016	6913.518	108.3294	1147.831
Sum Sq. Dev.	7235.631	72519.11	725224.2	1457547.	71.73896	126.2431
Observations	75	75	75	75	75	75

In Chemical sector of Pakistan firms on average have 9954135 PKR of Return on Assets, 37.76 of Collection period, 85.76 of Inventory period, 92.18 of Payment Period, 1.44 of Current Ratio and 15.30 of Firms Size.

4.2.2 Table 2: Correlation

	ROA	CP	IP	PP	CR	FS
ROA	1.000000	-0.140834	-0.157835	-0.243619	0.716236	0.020285
CP	-0.140834	1.000000	0.012699	-0.275244	0.225640	-0.334739
IP	-0.157835	0.012699	1.000000	0.186262	-0.177467	-0.160633
PP	-0.243619	-0.275244	0.186262	1.000000	-0.325838	-0.213256
CR	0.716236	0.225640	-0.177467	-0.325838	1.000000	-0.010187
FS	0.020285	-0.334739	-0.160633	-0.213256	-0.010187	1.000000

Above is the representation of Correlation between independent variables and Return on Assets that has been checked. All working capital components have negative correlation with ROA. This finding is consistent with the study of Deloof (2003) that evaluated the similar results for listed companies in Belgium. The results explains that longer period of collection, inventory and payment will decrease the profitability. Whereas firms size and current ratio are positively correlated with profitability.

4.2.3 Regression

Table 3: Eviews Results

Dependent Variable: ROA

Method: Panel Least Squares

Date: 05/25/15 Time: 12:44

Sample: 2009 2013

Periods included: 5

Cross-sections included: 15

Total panel (balanced) observations: 75

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.787498	12.02780	-0.148614	0.8823
CP	-0.005138	0.030606	-0.167892	0.8672
IP	-0.002713	0.008683	-0.312403	0.7557
PP	-0.000515	0.006830	-0.075366	0.9401
CR	7.159324	0.910478	7.863260	0.0000
FS	0.122507	0.720502	0.170030	0.8655
R-squared	0.514688	Mean dependent var	9.954135	
Adjusted R-squared	0.479521	S.D. dependent var	9.888316	
S.E. of regression	7.133852	Akaike info criterion	6.844198	
Sum squared resid	3511.538	Schwarz criterion	7.029597	
Log likelihood	-250.6574	Hannan-Quinn criter.	6.918226	
F-statistic	14.63532	Durbin-Watson stat	1.938555	
Prob(F-statistic)	0.000000			

Regression equation:

$$\text{ROA} = -1.78749806366 - 0.00513844342978*\text{CP} - 0.00271262719842*\text{IP} - 0.000514770069824*\text{PP} + 7.15932399599*\text{CR} + 0.122506763879*\text{FS}$$

Above shows the results of 15 listed chemical companies of Pakistan. According to the regression results, R-squared (Adjusted R-squared) is 0.479521 that means approximately 47.95% of the variance in the dependent variable ROA which depicts acceptable regression model and remaining 52.05% of the variance is unexplained but it can be defined by other factors which may influence profitability.

The table 3 that is Eviews results describe relationship among dependent and independent variables as if CP referred as Collection Period will be changed by 1 unit then decrease in ROA will be 0.00513844342978units. Similarly, IP referred as Inventory Period will be changed by 1 unit then decrease in ROA will be 0.00271262719842units. Additionally, Payment Period that is PP will be changed by 1 unit then decrease in ROA will be 0.000514770069824units. On the contrary, CR referred as Current Ratio will be changed by 1 unit then increase in ROA will be 7.15932399599units. But if FS referred as Firm Size will be changed by 1 unit then decrease in ROA will be 0.122506763879units and by the factor of 0.8655.

Table 4: Summary of Regression Analysis

Variables	Significance Probability	Test Result of Null Hypotheses (Accepted/ Rejected)
Collection Period (CP)	>0.05	Fail to reject
Inventory Period (IP)	>0.05	Fail to reject
Payment Period(PP)	>0.05	Fail to reject
Current Ratio(CR)	<0.05	Rejected
Firm Size(FS)	>0.05	Fail to reject

Chapter 5

DISCUSSION

5.1 Critical Debate

As per the results of this research, the relationship between Collection Period and ROA is not significant and negative correlation. It is not consistent with hypothesis 1. Therefore, null hypothesis 1 is failed to reject.

Collection period has insignificant negative effect on the profitability of firms which shows firms are having low profits because of their failure to convert debtors into liquidity in a given time period. It is according to the findings of (S.M.Amir Shah and Aisha Sana 2006), (Gill and Mathur 2010), Danuletiu (2010), Deloof (2003), Raheman and Nasr (2007), (Ali, 2011).

According to the results of this research, the relationship between Inventory Period and ROA is not significant and having negative relationship with profitability. It is not consistent with hypothesis 2. Therefore, null hypothesis 2 is failed to reject.

Higher inventory turnover indicates less profits of firms. (Deloof, 2003), (S.M.Amir Shah and Aisha Sana, 2006), (Ali, 2011), (Rehman and Nasr, 2007) proved negative relationship between inventory holding period and profitability because such firms were ineffective to sell their goods promptly.

As the results of table 3 shows that the relationship between Payment Period and ROA is not significant and negative correlation. It is not consistent with hypothesis 3. Therefore, null hypothesis 3 is failed to reject.

According to studies of Deloof (2003), Rehman and Nasr (2007), Padachi (2006), Ali (2011) found same result that firms with less profits delay their payments to creditors because such firms have minimum cash. Consequently firms do not have opportunity to avail significant discounts due to longer time period of payments to suppliers as if it affects credit policy.

According to the results the relationship between Current Ratio and ROA is significant and positive correlation. It is consistent with hypothesis 4. Therefore, null hypothesis 4 is rejected.

Current Ratio has significant direct impact over profitability. This is consistent with the finding of (Shin and Sonen, (1998).this shows that firms must have sufficient liquid firms to pay their current obligations.

The results of this research depicts the relationship between Firms Size and ROA is insignificant but positive correlation. It is not consistent with hypothesis 5. Therefore, null hypothesis 5 is failed to reject.

According to the studies of (Deloof, (2003), (Rehman and Nasr, (2007), found positive relation of firm size with profitability. It represents that firms with greater size will also have high revenues which gives advantage of bargaining power with suppliers and firms also have edge of acquiring loans by lenders.

Chapter 6

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Working capital components are crucial in taking appropriate financial decisions for increasing firms' profitability. Furthermore, efficiency and effectiveness of working capital components reveals strong financial position of companies irrespective of the nature of business. From this study, it is concluded that maintaining efficient level of working capital is very essential for chemical firms as well as for overall industries. Mostly firms of Pakistan do heavy investment in working capital. Hence it can be anticipated that the approach of managing working capital will have significant direct effect on firms' profitability.

The present study includes 15 listed chemical firms of Pakistan for the period of five years from 2009 to 2013. This research was mainly conducted for analyzing the effect of working capital management over profitability of firms. The results show that chemical firms' profitability is insignificantly affected by efficiency level of working capital management and it is also used for adding value for shareholders wealth. Following are the results obtained after applying regression model. Listed Pakistani firms of chemical sector have insignificant negative relationship between return on assets and collection period, inventory period and payment period. This results recommend that managers of firms can generate worth in their shareholders wealth by decreasing debtors' collection period and holding inventory period to optimum level. The inverse relationship between creditors' payment period and profitability of chemical firms shows that firms prolong the time period of payments for their bills. It is also found that Pakistani chemical firms have strong direct

impact of current ratio on profitability. This may be due to adequate cash in hand to pay debts. There was insignificant direct relationship of firms' size towards profitability.

6.2 Recommendations

All firms in chemical sector should give emphasis on the efficient management of working capital. For this reason, firms of chemical industry should create favorable policies of creditors and debtors as well as make assessment of existing policies. According to above research results, chemical firms should reduce their collection and payment cycle for running their businesses but this can only be done when financial managers have sound knowledge of maintaining working capital. Besides this firms also should sustain their inventory up to optimal level.

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APPENDICES

Year	ROA	CP	IP	PP	FS	CR
2009	7.0317	21.9241	102.1014	104.1956	16.3803	1.3513
2010	0.6545	8.8406	15.5690	291.6584	16.3692	0.3549
2011	-0.1156	4.8771	38.9102	776.1141	15.4543	0.3732
2012	3.6972	0.8162	57.7823	207.2306	15.5555	0.4356
2013	7.6452	0.6098	28.9510	98.9837	15.9705	0.3082
2009	11.7790	77.3125	84.1644	14.3162	15.9434	1.6588
2010	14.2240	58.2454	90.5535	21.8485	16.0232	1.8923
2011	14.3778	79.9363	114.3221	30.5068	15.6662	2.1189
2012	16.7036	95.9993	79.2701	28.7302	15.8593	1.5019
2013	29.3259	82.4888	100.5693	27.5066	15.9231	3.5796
2009	1.1670	58.9760	133.5433	125.8359	15.1032	0.8298
2010	4.0468	66.8824	136.2494	150.6422	15.0359	0.9190
2011	2.3134	67.9508	141.8645	174.3381	15.0939	0.9713
2012	-0.3475	62.5385	110.8242	65.0714	15.2147	0.9351
2013	1.9753	72.4681	98.7082	44.1480	15.2428	0.9620
2009	19.2312	11.0002	48.5547	46.0588	16.2372	2.5213
2010	25.0364	10.0287	62.6823	47.9346	16.2604	2.8460
2011	20.4565	8.2818	86.6271	60.9453	16.4653	2.2109
2012	20.5096	9.6073	78.2952	15.2064	16.7445	2.6802
2013	17.2673	9.6053	69.7074	11.9496	16.8245	2.8951
2009	13.8862	63.0877	55.3282	26.7302	14.8343	0.9575
2010	3.2548	74.4369	93.6975	24.8618	14.6843	0.9520
2011	1.3985	61.6245	66.5384	5.6432	14.7717	0.8942
2012	3.9053	59.4730	52.6454	17.1648	14.7559	1.1339
2013	-2.7443	56.8562	57.3625	22.1797	14.6920	1.0686
2009	5.7893	2.3426	89.6947	794.2799	12.1618	0.4409
2010	10.7807	13.7715	27.2361	238.0964	13.4726	0.5461
2011	3.7311	23.8131	52.3898	147.0672	14.1751	1.3074
2012	4.0854	15.4560	26.0774	10.3131	13.9915	0.9306
2013	2.1028	31.4627	21.3183	24.9937	14.1300	1.4121
2009	0.8647	13.8028	56.2442	114.8500	16.2693	0.6913
2010	5.0023	9.2233	59.6781	127.4941	16.4978	0.7616
2011	4.3594	6.2640	61.4839	218.2635	16.6517	0.5401

2012	0.1992	4.7772	65.4838	110.3504	16.8343	0.5645
2013	2.8414	7.7925	60.2845	102.5035	17.0179	0.7030
2009	14.6213	12.1708	52.6136	94.9869	17.1597	1.8705
2010	17.4098	8.5356	49.3622	71.6291	17.3707	2.1250
2011	13.3829	5.8807	50.4214	67.0663	17.5039	2.0685
2012	4.2787	24.8033	18.3102	16.7060	14.9559	1.1043
2013	3.6252	17.8335	104.1367	14.7545	16.7191	1.3774
2009	4.4453	58.6112	14.0440	6.7622	15.0876	1.2512
2010	3.7504	56.0992	23.8783	3.9981	14.9409	1.3016
2011	3.0021	53.5206	28.8677	3.6949	14.9611	1.0752
2012	3.2483	54.9426	16.9677	4.6508	15.1377	0.9608
2013	6.9004	59.5969	292.9164	9.1696	15.2690	0.9402
2009	18.8324	17.3648	14.5514	28.2402	17.4492	1.6596
2010	19.7753	25.2892	27.4006	44.0104	17.5627	1.7254
2011	17.4890	19.9260	32.2620	34.3205	17.8686	1.4441
2012	0.7930	22.8049	30.8360	38.5204	17.7825	1.2796
2013	2.7106	17.7821	18.7822	32.8323	17.8598	1.3710
2009	21.7212	54.9310	51.2877	39.6264	14.1402	1.1448
2010	0.7942	41.1376	472.8832	394.5289	14.3710	1.0826
2011	45.7165	34.9062	44.4189	35.5263	14.7039	1.2135
2012	11.7804	42.5458	25.5610	7.2181	14.8004	1.2602
2013	5.8148	62.0308	45.6090	11.7257	14.9149	1.3957
2009	-2.3610	33.9969	219.2776	35.5314	13.2481	1.4966
2010	13.3340	38.0882	73.3570	16.4152	13.5064	1.3581
2011	25.5057	30.3240	120.1073	44.7882	14.1876	1.5465
2012	46.6754	7.7770	9.5540	0.4072	14.3616	6.4602
2013	11.2457	11.0212	66.1050	41.7853	14.0910	2.8610
2009	10.7223	39.2223	669.7941	156.0812	15.6366	0.9147
2010	5.9160	27.5832	43.6820	59.1970	15.5622	0.8360
2011	4.6076	30.0835	69.2770	118.1018	15.6428	0.8743
2012	5.3451	38.9358	61.6576	21.8411	15.8256	0.6345
2013	7.7523	42.2207	65.9286	23.1083	15.9073	0.7505
2009	6.3377	28.2529	238.4139	140.5045	13.3511	0.7890
2010	1.1816	15.2241	133.7863	303.2902	13.4800	0.7322
2011	7.9658	6.8998	175.4160	276.4434	14.0696	0.7870
2012	7.2637	2.5509	184.9869	25.0282	13.8004	0.6209
2013	0.7427	11.6883	191.2760	36.5596	13.9202	0.8815
2009	26.9291	144.8272	37.4904	86.4135	13.4804	2.2641

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2010	23.5546	123.6851	35.6020	71.2566	13.4768	3.4601
2011	18.7607	120.2135	24.8894	72.8664	13.4569	3.5101
2012	11.8773	69.3636	42.6058	50.3464	13.9531	2.7029
2013	16.6757	67.0685	28.9868	45.5728	14.0072	2.9491