

P-2800



AN EMPIRICAL ANALYSIS OF WORKING CAPITAL AND PROFITABILITY OF
ROOTS INDUSTRIES INDIA LIMITED, COIMBATORE

A PROJECT REPORT
submitted by

S.B.VASANTH KUMAR
Reg. No. 0720400055

In partial fulfillment of the requirements
for the award of the degree

of

MASTER OF BUSINESS ADMINISTRATION

April, 2009

KCT Business School
Department of Management Studies
Kumaraguru College of Technology
(An autonomous institution affiliated to Anna University, Coimbatore)
Coimbatore-641 006



ROOTS INDUSTRIES INDIA LIMITED

RIL/HRD/28/7/09

27-04-2009

PROJECT CERTIFICATE

This is to certify that **Mr.S.B.Vasanth kumar, II MBA** student of **Kumara Guru College Of Technology** has done a project work on **“A empirical analysis of working capital and profitability”** in our organization from **Jan 09** to **April 09**.

For ROOTS INDUSTRIES LIMITED,


(RAVINDASAN)

DIRECTOR



Regd.office: **ROOTS GROUP OF COMPANIES: R.K.G. Industrial Estate, Ganapathy,**

Coimbatore - 641 006. INDIA.

Ph:+91(422) 4330 330, Fax:+91(422) 2332 107 E-mail: info@roots.co.in

Factory: kathimaickenpalayam road, thoppampatty, coimbatore-17, INDIA



DEPARTMENT OF MANAGEMENT STUDIES

**KUMARAGURU COLLEGE OF TECHNOLOGY
COIMBATORE – 641006**



BONAFIDE CERTIFICATE

Certified that this project report titled **“AN EMPIRICAL ANALYSIS OF WORKING CAPITAL AND PROFITABILITY OF ROOTS INDUSTRIES INDIA LIMITED, COIMBATORE”** is the Bonafide work of Mr. S.B.VASANTH KUMAR (Reg No. 0720400055) who carried out this research under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

Faculty Guide

Director

Evaluated and Viva Voce conducted on 5/5/2009

INTERNAL EXAMINER 5-5-09

EXTERNAL EXAMINER

DECLARATION

I, hereby declare that this project report entitled as “**AN EMPIRICAL ANALYSIS OF WORKING CAPITAL AND PROFITABILITY OF ROOTS INDUSTRIES INDIA LIMITED, COIMBATORE**”, has undertaken for academic purpose submitted to Anna University, Coimbatore in partial fulfillment of requirement for the award of the degree of Master of Business Administration. The project report is the record of the original work done by me under the guidance of Ms. Sangeetha.S, MBA,Mphil,Lecturer, MBA Department during the academic year 2008-2009.

I, also declare hereby, that the information given in this report is correct to the best of my knowledge and belief.

Date: 02/05/09

Place: Coimbatore



(S.B.VASANTH KUMAR)

ACKNOWLEDGEMENT

It is inevitable that thoughts and ideas of other people tend to drift into subconscious when one feels to acknowledge helping derived from others. I acknowledge to all those who helped me in the preparation of this project work.

I wish to express my sincere thanks to **DR.S.V.Devanathan** – Director, KCT Business School, for his continuous encouragement throughout my project.

I owe my hearty gratitude to **Ms.S. Sangeetha MBA, Mphil**, Lecturer KCT Business School, for his help and valuable guidance given to me throughout my project.

I also extend my hearty thanks to all the faculty members of KCT Business school, for their support provided to me throughout my project.

I express my sincere thanks to **Mr.N.Sampath Kumar**, Associate Head – Training and Development, ROOTS Industries Limited, Coimbatore for granting permission to do my project work.

I like to extend my hearty thanks to **Mr.G.Balasubramaniam**, Company Secretary, ROOTS Industries Limited, Coimbatore, who guided me to complete my project work.

Table of Contents

Chapter	Description	Page No
	Company certificate	i
	Bonafide certificate	ii
	Acknowledgement	iii
	Table of contents	iv
	List of tables	v
	List of charts	vi
	Abstract	vii
1	Introduction	
	1.1 About the study	1
	1.2 About the industry	10
	1.3 About the company	15
2	Main theme of the project	
	2.1 Objectives of the project	24
	2.2 Scope and Limitations	24
	2.3 Methodology	25
	2.4 Review of Literature	26
3	Analysis and Interpretation	30
4	Findings, Suggestions and Conclusion	59
	Bibliography	64

List of Tables

Table No.	Name of the tables	Page No.
3.1	Table showing the Raw materials turnover of Roots Industries Limited for the period 2004-2008	30
3.2	Table showing the Work in progress turnover of Roots Industries Limited for the study period 2004-2008	32
3.3	Table showing the Finished goods turnover of Roots Industries limited for the study period 2004-2008	34
3.4	Table showing the Collection Period of Roots Industries Limited for the study period 2004-2008	36
3.5	Table showing the Payment Period of Roots Industries Limited for the study period 2004 – 2008	38
3.6	Table showing the Cash cycle and the Operating cycle of Roots Industries Limited for the study period 2004-2008	40
3.7	Table showing the Gross Working and Net Working Capital of Roots Industries Limited for the study period 2004-2008	42
3.8	Table showing the Cash Turnover Ratio and Cash Turnover Period of Roots Industries Limited for the study period 2004-2008	44
3.9	Table showing the cash balances and cash demand of Roots Industries Limited for the study period 2004-2008	48
3.10	Table showing the Optimal cash balances using Baumol model for Roots Industries Limited for the study period 2004-2008	49
3.11	Table showing the average cash balances using Miller-Orr model for Roots Industries Limited for the study period 2004-2008	50
3.12	Table showing the optimal and the projected cash balance under uncertainty and uncertainty of Roots Industries Limited for the study period 2004-2008	51
3.13	Table showing the Multi discriminant analysis of Roots Industries Limited for the study period 2004-2008	53
3.14	Table showing the Working Capital, Acid Test and Current Assets to Total Assets Ratio of Roots Industries Limited for the period 2004-2008	55
3.15	Table showing the Current Assets to Sales, Working Capital Turnover and Inventory Turnover Ratio of Roots Industries Limited for the period 2004-2008	55

3.16	Table showing the Debtors Turnover, Creditors Turnover and Return on Investments of Roots Industries Limited for the period 2004-2008	56
3.17	Table showing the Correlation Matrix for the ratios of Roots Industries Limited for the period 2004-2008	57

List of Charts

Chart No.	Name of the charts	Page No.
3.1	Chart showing the Raw materials turnover of Roots Industries Limited for the study period 2004-2008	31
3.2	Chart showing the Work in progress turnover of Roots Industries Limited for the study period 2004-2008	33
3.3	Chart showing the Finished goods turnover of Roots Industries limited for the study period 2004-2008	35
3.4	Chart showing the Collection Period of Roots Industries Limited for the study period 2004-2008	37
3.5	Chart showing the Payment period of Roots Industries Limited for the study period 2004-2008	39
3.6	Chart showing the Cash cycle and the Operating cycle of Roots Industries Limited for the study period 2004-2008	41
3.7	Chart showing the Gross Working and Net Working Capital of Roots Industries Limited for the study period 2004-2008	43
3.8	Chart showing the Cash Turnover Ratio of Roots Industries Limited for the study period 2004-2008	45
3.9	Chart showing the Cash Turnover Period of Roots Industries Limited for the study period 2004-2008	46
3.10	Chart showing the Multi Discriminant Analysis of Roots Industries Limited for the study period 2004-2008	54

ABSTRACT

The automobile industries play a leading role in the Indian economy in the recent years. For most of the international brands of automobile industries, India is the target country to sell their cars and other vehicles. India is not only the target country but also becoming an automobile hub for most of the international brands of vehicle manufacturers. This is because there are numerous supporting Indian vendors to supply the automobile components to meet the international standards of quality.

Roots Industries India Limited is a leading automobile components manufacturer occupying a key position in both international and domestic market as suppliers to leading OEMs. The main objective of the present study is to conduct the empirical analysis of working capital and profitability of the firm.

A descriptive cum analytical study has been performed to conduct the working capital management of the concern. Annual records of 5 years (2003-04 to 2007-08) form the secondary source of data for the study. The collected data is collated and analyzed. Baumol and Miller orr model has been used for the analysis of cash management which is the vital part of working capital management.

A correlation analysis has been conducted to determine the nature and strength of the relationship between return on investment and profitability ratios. Ratio analysis a vibrant tool for the financial statement analysis is used to explore the dimension of working capital management of the concern. Major elements representing the working capital position were projected for future years. Suitable recommendations were made for future improvement of the working capital position.

CHAPTER 1

INTRODUCTION

1.1 About the Study

Every business needs funds for two purposes- for its establishment and to carry out its day to day operations. Long-term funds are required to create production facilities through purchase of fixed assets such as plant and machinery, land, building, furniture, etc. funds are also needed for short term purposes for the purchase of raw materials, payment of wages and other day-to-day expenses, etc. these funds are known as working capital. In simple words, working capital refers to that part of the firm's capital which is required for financing short term or current assets such as cash, marketable securities, debtors and inventories. Working capital is also known as revolving or circulating capital or short-term capital.

There are two concepts of working capital:

1) **Balance sheet concept**

There are two interpretations of working capital under the balance sheet concept,

- **Gross Working capital**

It refers to the amount of funds invested in current assets or simple terms, the gross working capital is the capital invested in total current assets of the enterprise.

- **Net working capital**

It refers to the excess of current assets over current liabilities.

Net working capital = Current assets – Current liabilities

2) Operating cycle or circular flow concept

Funds invested in current assets keep revolving fast and are being constantly converted into cash and this cash flow out again in exchange for other current assets. Hence, it is known as revolving or circulating capital.

The circular flow concept of working capital is based upon this operating of working capital cycle of a firm.

Gross operating cycle = Raw material turnover + Work in progress turnover

+ Finished goods turnover + Collection period.

Raw material turnover = (Average raw materials / Raw materials consumed)

*** 360**

Work in progress turnover = (Average work in progress / Cost of production) * 360

Finished goods turnover = (Average finished goods / Sales) * 360

Collection period = (Average receivables / Sales) * 360

Net operating cycle = Gross operating cycle – Payable deferral period

Payable deferral period = Average payables / Net credit purchases per day

A successful sales programme is, in other words, necessary for earning profits by any business enterprise. However, sales do not convert into cash instantly; there is invariably a time-lag between the sale of goods and the receipt of cash. There is, therefore, a need for working capital in the form of current assets to deal with the

problem arising out of the lack of immediate realization of cash against goods sold. Therefore, sufficient working capital is necessary to sustain sales activity. Technically, this is referred to as the operating or cash cycle.

The operating cycle can be said to be at the heart of the need for working capital. The continuing flow from cash to suppliers, to inventory, to accounts receivables and back into cash is what is called the operating cycle.

In other words, the term cash cycle refers to the length of time necessary to complete the following cycle of events:

- 1. Conversion of cash into inventory;**
- 2. Conversion of inventory into receivables;**
- 3. Conversion of receivables into cash.**

THE BAUMOL'S MODEL:

The baumol model of cash management provides a formal approach for determining a firm's optimum cash balance under certainty. It considers cash management similar to an inventory management problem. As such, the firm attempts to minimize the sum of the cost of holding cash (inventory of cash) and the cost of converting marketable securities to cash.

The baumol's model makes the following assumptions:

- The firm is able to forecast its cash needs with certainty
- The firm's cash payments occur uniformly over a period of time.
- The opportunity cost of holding cash is known and it does not change over time
- The firm will incur the same transaction cost whenever it converts securities to cash.

Assume that the firm sells securities and starts with a cash balance of C rupees. As the firm spends cash balance decreases steadily and reaches to zero.

The firm replenishes its cash balance to C rupees by selling marketable securities. This pattern continues over time. Since the cash balance decreases steadily, the average cash balance will be $C/2$.

The firm incurs a holding cost for keeping the cash balance.

It is an opportunity cost; that is, the return foregone on the marketable securities. If the opportunity cost is k , then the firm's holding cost for maintaining an average cash balance is as follows:

$$\text{Holding cost} = k(C/2)$$

The firm incurs a transaction cost whenever it converts marketable securities to cash. Total number of transactions during the year will be total funds requirement T , divided by the cash balance, C , i.e. T/C . The per transaction cost is assumed to be constant, if per transaction cost is c , then total transaction cost will be:

$$\text{Transaction cost} = c (T/C)$$

The total annual cost of the demand for cash will be:

$$\text{Total cost} = k (C/2) + c (T/C)$$

What is the optimum level of cash balance, C^* ? The holding cost increases as demand for cash, C , increases. However, the transaction cost reduces because with increasing C the number of transactions will decline. Thus, there is a trade-off between the holding cost and the transaction cost.

The optimum cash balance, C^* is obtained when the total cost is minimum. The formula for the optimum cash balance is as follows:

$$C^* = \sqrt{2cT/k}$$

Where C^* is the optimum cash balance, c is the cost per transaction, T is the total cash needed during the year and k is the opportunity cost of holding cash

balance. The optimum cash balance will increase with increase in the per transaction cost and total funds required and decrease with the opportunity cost.

THE MILLER-ORR MODEL

The limitation of the baumol model is that it does not allow the cash flows to fluctuate. Firms in practice do not use their cash balance uniformly nor are they able to predict daily cash inflows and outflows. The Miller-Orr model overcomes this shortcoming and allows for daily cash flows variation. It assumes that net cash flows are normally distributed with a zero value of mean and standard deviation. The model provides for two control limits – the upper control and the lower control limit as a return point. If the firm cash flows fluctuate randomly and hit the upper limit, then it buys sufficient marketable securities to come back to a normal level cash balance (the return point). Similarly, when the firm cash flows wonder and hit the lower limit, it sells sufficient marketable securities to bring the cash balance back to the normal level (return point).

The firm sets the lower control limit as per its requirement of manufacturing minimum cash balance. The upper control limit will be set the difference upper limit and lower limit depends on the following factors

- The transaction cost (c)
- The interest rate (i)
- The standard deviation of net cash flows

The formula for determining the distance between upper and lower control limits (called z) as follows:

$$\text{(Upper limit – lower limit)} = \text{cubic root of } (3/4 * \text{transaction cost} * \text{cost flow technique/interest per day})$$

The upper control limit is three times above the lower control limit and return point lies between the upper and the lower limits. Thus

$$\text{Upper limit} = \text{lower limit} + 3Z$$

$$\text{Return point} = \text{lower limit} + Z$$

The net effect is that the firms hold the average cash balance equal to:

$$\text{Average cash balance} = \text{lower limit} + (4/3)Z$$

The MO model more realistic since it allows variation in cash balance within lower and upper limits. The financial manager can set the lower limit according to the firms liquidity requirement. The past data of the cash flow behavior can be used to determine the standard deviation of net cash flows. Once the upper and lower limits are set, managerial attention is needed only if the cash balance deviates from the limit. The action under these situations are anticipated and the planned in the beginning.

CORRELATION ANALYSIS

Correlation analysis is the statistical tool we can use to describe the degree to which one variable is linearly related to another. Often, correlation analysis is used in conjunction with regression analysis to measure how well the regression line explains the variation of the dependent variable, Y. correlation can also be used by itself, however, to measure the degree of association between two variables.

Statisticians have developed two measures for describing the correlation between two variables: the coefficient of determination and the coefficient of correlation. The coefficient of determination is the primary way we can measure the extent, or strength, of the association that exists between two variables, X and Y.

THE COEFFICIENT OF CORRELATION

The coefficient of correlation is the second measure that we can use to describe how well one variable is explained by another. When we are dealing with samples, the sample coefficient of correlation is denoted by r and is the square root of the sample coefficient of determination:

$$r = \sqrt{r^2}$$

The relationship, which is expressed by what is known as the correlation coefficient, is represented by a value within the range of -1.00 to +1.00.

A correlation coefficient of +1.00 indicates that two ratios move in the same direction at all times. If ratio A gains in value, we would expect ratio B to gain as well.

A correlation coefficient of 0 indicates that the price movements are totally random. A gain by ratio A provides no insight into the expected movement of ratio B.

The ratios relating to working capital management which have been selected and computed for the study are: (i) Working Capital Ratio (WCR) (ii) Acid Test Ratio (ATR) (iii) Current Assets to Total Assets Ratio (CTTR) (iv) Current Assets to Sales Ratio (CTSR) (v) Working Capital Turnover Ratio (WTR), (vi) Inventory Turnover Ratio (ITR) (vii) Debtors Turnover Ratio (DTR) and (viii) Creditors Turnover Ratio (CTR). For determining the sensitivity of ROI to change in the level of working capital, the working capital leverage has been computed. All statistical computations have been done through SPSS.

MULTI DISCRIMINANT ANALYSIS:

In this study, financial ratios are derived from the financial statements of the firm. These ratios cover the key financial performance area of profitability. All of the aggregated ratios are processed using principal components analysis. This analysis is utilized to reduce the number of ratios that are interrelated, remove ratio redundancy, and identify the salient dimensions represented by the ratios. The

expected result is a set of factors (ratios) that are orthogonal (uncorrelated) to each other.

Multiple discriminant analysis (MDA) will then be performed on the remaining ratio set using a direct approach, whereby all of the ratios are used for computation at the same time. MDA is used as it considers linear combinations of the ratios to generate a combination that best classifies the sample used. The generated combination then forms the prediction model.

For the purpose of this study, the following model which is expected to be able to predict insolvency of the firm will be used:

$$Z = W_1X_1 + W_2X_2 + \dots + W_nX_n$$

Where: Z ~ the discriminant score,

W_1, W_2, W_n , ~ the discriminant weights,

X_1, X_2, X_n , ~ the remaining ratio set that represent the actual condition of the firm

The model has to be validated in terms of its predictive ability. The slight reduction in predictive ability is deemed satisfactory for this study, since it is important to take note that inherent qualitative elements affecting the financial statements of the firm will, to a certain extent, affect the accuracy level of the model.

From this, Altman used empirical data and regression analysis in order to formulate an algorithm comprised of fractions to which predetermined weights were applied. Scores above or below certain measures indicated the likelihood one would fall into bankruptcy. Altman's tool was found to have a correlation factor of 95% in predicting companies that would file for bankruptcy some 12 months prior to such actual filing, 72% 24 months prior to such a happening, and 48% 36 months before—highly accurate by most measures.

Nevertheless, we are only using Altman's algorithm to sense improvement or degradation in business condition (an inflection point), one period to the next.

Hence, in our application of Altman's model, the degree of change in score is significantly more important than the score itself.

Altman's Z-Score-A Discriminant Function Algorithm

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$$

Where:

X_1 = Working capital divided by total assets;

X_2 = retained earnings divided by total assets;

X_3 = earnings before interest and taxes (EBIT) divided by total assets;

X_4 = market value divided by total debt;

X_5 = sales divided by total assets; and

Z = overall index of corporate fiscal health.

THE INTERPRETATION OF Z SCORE:

Z-SCORE ABOVE 3.0 -The company is safe based on these financial figures only.

Z-SCORE BETWEEN 2.7 and 2.99 - On Alert. This zone is an area where one should exercise caution.

Z-SCORE BETWEEN 1.8 and 2.7 - Good chances of the company going bankrupt within 2 years of operations from the date of financial figures given.

Z-SCORE BELOW 1.80- Probability of Financial embarrassment is very high.

1.2 About the industry

The macro and micro analysis of auto parts industries in economic growth, competitive strength, career growth, opportunities, etc., in domestic and foreign countries. The brief discussion is as follows;

Macro Analysis

The auto parts industry directly influences the economies of the United States and the world. In a typical year, the U.S. auto parts industry generates around 17 percent of manufacturers' shipments of durable goods (products designed to last at least three years). Auto parts production consumes large amounts of iron, steel, aluminium, and rubber. The automobile industry also consumes more copper, glass, zinc, and leather, plastic, lead and platinum than any other U.S. industry.

In 1997, U.S. retail sales of auto parts exceeded \$284 billion, 3.5 percent of the nation's gross domestic product. India is the second largest producer of motorcycles in the world (5.2 Million) after China which has a production volume of 12 Million. India would be the third largest economy (after China and US) by 2050 "Goldman Sachs Report".

Indian Auto Industry is the

- Largest Three Wheeler Market in the World
- Second largest Two Wheeler Market in the World
- Fourth largest Passenger Vehicle Market in Asia
- Fourth largest Tractor Market in the World
- Fifth largest Commercial Vehicle Market in the World

The Future Growth Drivers

- Higher GDP Growth
- India's huge geographic spread- Mass Transport System
- Increasing Road Development

- Increasing disposable Income with the service sector
- Cheaper (declining interest rates) & easier finance Schemes
- Replacement of aging four wheelers
- Graduating from two wheelers to four wheelers
- Increasing dispensable income of rural agricultural sector
- Growing Concept of Second Vehicle in Urban Areas



Range of Vehicles made in India include

Light Passenger Vehicles including Passenger Cars, MUV's, SUV's, Commercial Vehicles including Light Commercial Vehicles, Medium and Heavy Commercial Vehicles and Buses, Tractors including Farm, Earthmoving and Construction Equipments, Two Wheelers including Motorcycles, Scooters and Mopeds, Three Wheelers including Passenger Carriers and Goods Carriers.

The Automotive Component Manufacturers Association of India (ACMA) is the nodal agency for the Indian Auto Component Industry. Its active involvement in trade promotion, technology up-gradation, quality enhancement and collection and dissemination of information has made it a vital catalyst for this industry's development. It's other activities include participation in international trade fairs, sending trade delegations overseas and bringing out publications on various subjects related to the automotive industry.

ACMA is represented on a number of panels, committees and councils of the Government of India through which it helps in the formulation of policies pertaining to the Indian automotive industry. For exchange of information and especially for co-operation in trade matters, ACMA has signed Memoranda of Understanding with its counterparts in USA, Canada, UK, France, Italy, Spain, Japan, South Korea, Malaysia, Uzbekistan, Pakistan, Australia, Egypt, Iran, Tunisia, South Africa, and Thailand & Scandinavia.

ACMA represents over 479 companies, whose production forms a majority of the total auto component output in the organised sector. In the domestic market they supply

components to vehicle manufacturers, Tier-1 suppliers, to state transport undertakings, defence establishments, railways and even to the replacement market. A variety of components are being exported to OEMs and after markets worldwide.

The industry has been exporting around 15% of its output and growing at the rate of 30%. In the year 2003-04, industry has exported US\$ 1 billion versus US\$ 760 million in year 2002-2003. Principal export items include replacement parts, tractor parts, motorcycle parts, piston rings, gaskets, engine valves, fuel pump nozzles, fuel injection parts, filter & filter elements, radiators, gears, leaf springs, brake assemblies & bearings, clutch facings, head lamps, auto bulbs & halogen bulbs, spark plugs and body.

Micro Analysis

The Indian auto components industry has an estimated production of US\$ 10 billion. The spiralling demand from domestic and international auto companies has seen this sector emerging as one of the fastest growing manufacturing sectors in India and globally.

According to the ACMA (Auto Components Manufacturers Association of India), the sector is set to grow at a CAGR of 15 per cent till fiscal 2012. This sector is now working towards an open market. And with India estimated to have the potential to become one of the top five auto component economies by 2025, the pace is expected to pick up even further.

Moreover the automotive components industry is perceived as a lucrative sector with tremendous potential for foreign direct investments. The year 2006-07 saw the auto components sector soar with exports touching the US\$ 3 billion mark and investments continuing unabated. The ACMA estimates the global sourcing of components from the country to double from US\$ 2.95 billion to US\$ 5.9 billion in 2008-09, and touch US\$ 20 billion in seven years owing to the huge and growing markets both within India, and overseas.

The ACMA-McKinsey Vision 2015 document forecasts the potential for the Indian auto component industry to be US\$ 40-45 billion by 2015. Global automobile manufacturers see India as a manufacturing hub for auto components and are rapidly ramping up the value of components they source from India due to:

- The cost competitiveness in terms of labour and raw material
- Its established manufacturing base
- Fine quality of components manufactured in India (used as original components for vehicles made by General Motors, Mercedes, IVECO and Daewoo among others).

As a result Japanese and British component manufacturers are seeking joint-ventures in India. Delphi, the auto component division of General Motors is planning to set up plants in India. Robert Bosch, auto parts maker of Germany has relocated manufacture of certain products to MICO, India. Crosslink International Wheels, Malaysia's leading automobile security provider has set up its manufacturing unit at Baddi to make India the export hub for the SAARC region. Foreign auto makers, including Ford Motor Co., General Motors Corp., Honda Motor Co., Toyota Motor Corp., DaimlerChrysler AG and Hyundai Motor Co., all looking to increase their presence in India and use it as an export hub.

The Indian automotive export industry has made a global mark. According to ACMA, more than a third (36 per cent) of Indian auto component exports head for Europe, with North America featuring a close second at 26 per cent.

Foreign Investments

India enjoys a cost advantage with respect to casting and forging as manufacturing costs in India are 25 to 30 percent lower than their western counterparts. Seeing the growing popularity of India in the automotive component sector (a whopping US\$ 530 million in terms of foreign direct investment), the Investment Commission has set a target of attracting foreign investment worth US\$ 5 billion for the next five years to

increase India's share in the global auto components market from the existing 0.4 per cent to 3-4 per cent.

- Chrysler is setting up a local sourcing unit in Chennai and is expected to start sourcing for its global plant by next year.
- Palfinger AG, the Austrian hydraulic lifting, loading and handling systems manufacturer, has joined hands with Western Auto LLC, Dubai, the vehicle dealership arm of ETA Star group, have invested US\$ 1.7 million to set base in India.
- IFCI Venture Capital Funds Limited is launching a private equity fund in association with German consultancy UBF-B worth US\$ 144.67 million focussed entirely on domestic automotive components industry.
- Auto parts maker Robert Bosch of Germany will invest US\$ 201.4 million in its Indian subsidiaries over the next two years.
- Swiss company Rieter Automotive India aims to increase its production capacity in India and extend its product range to heat shields
- Fiat is setting up a group purchasing office in India as part of its strategy to cut costs by buying more components from low-cost centres such as India and China.
- Daimler, Hero joint venture will invest US\$ 1.1 billion in 5 years to manufacture light and medium CVs initially, and heavy-duty vehicles by 2012.

Domestic Investments

The market is so large and diverse that a large number of players can be absorbed to accommodate buyer needs. The sector not only has global players looking to invest and expand but leading domestic component companies are also pumping in huge sums into expanding operations: Bharat Forge invested US\$ 135 million in its Pune plant for increasing domestic capacity to 240,000 tonnes.

- Sona Koyo plans to have capacity of three million pieces of manual steering gears, 500,000 units of hydraulic power steering and 250,000 units of electronic power steering (EPS), apart from doubling the capacity of steering columns from one million parts.

- Rico Auto is investing US\$ 23 million to expand capacity.
- Apollo Tyres plans to invest US\$ 469.58 million in the next three years to increase its production capacity both in India and abroad.
- Kesoram Industries is planning to set up three new tyre units in the northern state of Uttaranchal to take its tyre-making capacity to 734 metric tonnes per day.

With such accelerating interest by both domestic and foreign investors, the Indian auto component industry is set to grow exponentially. The Indian auto component industry has reached a turnover size of US\$ 15 billion in 2006-07. The auto parts industry has emerged as one of India's fastest growing manufacturing sectors, growing at a compound annual growth rate (CAGR) of 28.9 per cent in value terms between 2002-03 and 2006-07.

The auto components industry has attracted investments, to the tune of US\$ 5.4 billion, in 2006-07 alone. India expects to attract US\$ 5 billion in foreign direct investment (FDI), over the next five years in the sector. According to industry estimates, by 2015, the Indian auto component industry is expected to reach the size of US\$ 33-40 billion. Driven by India's emergence as the low cost-high quality auto component sourcing destination, exports are expected to contribute US \$ 20-25 billion to this industry size.

1.3 About the company

Roots Industries India Limited

Roots Industries India Ltd. is a leading manufacturer of horns in India and the 11th largest Horn Manufacturing Company in the world. It is headquartered in Coimbatore - India, roots has been a dominant player in the manufacture of Horns and other products like Castings and Industrial Cleaning Machines. Since its establishment in 1970, roots have had a vision and commitment to produce and deliver quality products adhering to International Standard. With a strong innovative base and commitment to Quality, Roots Industries Limited has occupied a key position in both international and domestic market as suppliers to

leading OEMs and after market. Similar to products, Roots has leading edge over competitors on strong quality system base.

RIL is the first Indian Company and first horn manufacturing company in the world to get ISO/TS 16949 certification based on effective implementation of QS 9000 and VDA 6.1 system requirement earlier. RIL has entered into technical collaboration with Robert Bosch, SA to further enhance the technical competence. Roots' vision is to become a world class company manufacturing world class product, excelling in human relation.

Roots vision:

We will stand technologically ahead of others to deliver world-class innovative products useful to our customers. We will rather lose our business than our customers' satisfaction. It is our aim that the customer should get the best value for his money.

Every member of our company will have decent living standards. We care deeply for our families, for our environment and our society. We promise to pay back in full measure to the society by way of selfless and unstinted service.

Management:

ROOTS Industries Ltd is managed by an excellent team of path-breakers, chief among them being the Chairman, Mr. K. RAMASAMY, a Master's Degree Holder in Automobile Engineering from Lincoln Technical Institute, USA.

The company credo is echoed in his own words,

"At ROOTS, we believe that if something is worth doing, it is worth doing well. And this attitude is reflected in every realm of our activities. As a customer, you naturally expect the best. We are fully geared, in spirit and method, to meet your requirements."

He is supported by technical and administrative people, experts in their own field, who together strive to maintain the highest quality quotient in all of ROOTS' products.

Global alliances for competitive advantage:

Roots is a leading Original Equipment supplier to major vehicle manufacturers like Mercedes Benz, Mitsubishi, Mahindra & Mahindra, Toyota, Fiat, TELCO, TVS, Kinetic, etc. The technical collaboration with Robert Bosch S.A. of Spain starting from 1995 has strengthened the R&D activities and increased Roots' technical competence to international standards.

Roots Multiclean Ltd. (RMCL) is a joint venture with Hako Werke GmbH & Co., Germany, one of the largest cleaning machine manufacturers with global operations. RMCL is the sole representative in India and SAARC countries for Hako Werke's entire range of cleaning equipment. The quality of RMCL products is so well established that Hako buys back a major portion for their global market. RMCL also represents several global manufacturers of cleaning products and is gearing itself up to provide customized, total cleaning solutions.

Network:

Roots products have successfully made their presence heard loud and clear in the global market. Roots horns are exported to over 15 countries worldwide. A major share of the exports goes to USA, Japan, Middle East and South America. Roots are the only Indian company that meets the demanding standards of the Japanese markets. Roots cleaning equipment and die cast parts, etc. are exported to USA, Europe, Australia, Japan, Far East, South America and several other advanced countries.

Roots Group Of Companies

Company	Products
Roots Industries India Limited	Electric horns
Roots Auto Products Private Limited	Air horns, Switches
Roots Multiclean Limited	cleaning machines
Roots Cast Private Limited	Zinc pressure die cast
Roots Precision Products Ltd	Dies, Tools, jigs & fixtures
Roots Digital Engineering Service Ltd	Digital engineering equipments
Roots Metrology Laboratory	Instrument calibration
Roots Polycrafts	Plastic components
R K Nature Cure Home	Nature cure therapy
Satchidananda Jothi Nikethan School	International school
Crystal Clean Care	Modern cleaning technique
Roots Industries Malaysia Sdn. Bhd	Electric horns

Quality policy:

We are committed to provide world-class products and services with due concern for the environment and safety of the society.

This will be achieved through total employee involvement, technology up gradation, cost reduction and continual improvement in

- * Quality of the products and services
- * Quality Management system
- * Compliance to QMS requirements

Quality will reflect in everything we do and think

- * Quality in behavior
- * Quality in governance
- * Quality in human relation

Quality - An All Pervasive Entity

Roots are committed to manufacture customer-centric and technology-driven products on par with international quality standards. For example, the horns manufactured undergo a rigorous life-cycle test and are subjected to an endurance of over 200,000 cycles of performance while the industry norm requires only 100,000.

What's more, Roots believes in a quality culture that goes beyond just products. Equal emphasis is given to quality in human relation and quality in service. Roots in its journey towards Total Quality Management have reached important milestones: ISO 9001, QS 9000, VDA 6.1, ISO/TS 16949 and ISO 14001 Certification, presently in the process of obtaining NABL accreditation for our Metrology lab. The Group's TQM policy has a well-integrated Quality Circle Movement with active employee participation at various levels.

Environmental Policy

Roots industry is concern towards maintaining and improving the Quality of Life, Roots is committed for sustainable development by minimizing pollution and conserving resources. This can be achieved through continual improvement in Environmental Awareness of all employees & associates, Legal Compliance and Objective towards Environmental Protection.

HRD policies:

Roots have a strong people-oriented work culture that can be seen and felt across all its member concerns. Whether they work in group or in isolation, their effort

is well appreciated and achievements well rewarded. They have a sense of belonging and they revel in an environment of openness and trust. Cross-functional teams function as one seamless whole and foster the true spirit of teamwork.

Roots as a learning organization systematically train its employees at all levels. Conducted in-house, the training programmes equip them to meet new challenges head on. Employees are encouraged to voice their feelings, ideas and opinions. There is a successful suggestion scheme in operation and best suggestions are rewarded. Lasting relationship will evolve only when people know that their work is valued and that they contribute meaningfully to the growth of the organization. At Roots, people across the group companies, through interactions at workshops and seminars, get to know each other individually, share their common experiences and learn something about life.

Engineering research centre in roots industries limited:

The Engineering Research Centre (ERC) is involved in the continuous improvement and enhancement of design to increase performance and reliability. The ERC functioning under three distinct heads cater to the needs of Roots Industries, Roots Multiclean and Roots Auto Products.

Though there is a three-pronged operational ethos, the ERC is integrated and meshed seamlessly with one single objective: that of design research and performance monitoring. Through extensive product engineering, the ERC cell of ROOTS achieves the following:

- Designing and developing new products with customer focus.
- Conducting required tests to ensure product reliability.
- Initiating necessary corrective and preventive action for ensuring peak performance
- Fine-tuning products with available components to satisfy customer requirements

The ERC consists of the best talent that includes engineering graduates, ITI brains and design engineers. The team works with top-notch tools like

- Proe2000i2 - for solid modeling
- AutoCAD 2000 - for Drafting
- CorelDraw V 8.0 - for Graphical Applications

MILESTONES:

- 1970** Promotes American Auto Service for manufacture of Electric Horns.
- 1972** First to manufacture Servo Brakes for Light Motor Vehicles.
- 1984** Roots Auto Products Private Limited was established to manufacture Air Horns. Die Casting Unit commences commercial operations.
- 1988** Polycraft, a unit for Plastic Injection Moulding was established.
- 1990** Roots Industries Private Limited takes over Electric Horn business.
- 1992** RMCL enters into Techno-Financial collaboration with M/s. Hako Werke GmbH Germany.
- 1992** Roots Industries Private Limited obtains the National Certification - ISI mark of quality.
- 1994** Production of floor cleaning equipment commences. Roots Industries Private Limited wins American International Quality Award.
- 1999** Becomes the first horn manufacturer in Asia to obtain QS 9000
- 2000** Becomes the first horn manufacturer in Asia to obtain VDA 6.1 and the first in the world to win ISO / TS 16949
- 2000** The first to introduce digitally controlled air horns and low frequency, low decibel irritation free Jumbo Air Horns.
- 2003** Roots Industries Ltd., Horn Division is accredited with ISO 14001 : 1996

- 2003** Roots Industries Ltd., upgraded its ISO / TS 16949 from 1999 version to 2002 version
- 2004** Roots Industries Limited (RIL) opens its 100% exclusive Export Oriented Unit at the Horn Division Thoppampatti, Coimbatore to cater the needs of Ford North America.
- 2004** RIL's EOU commences its supplies to Ford, North America
- 2004** Roots Multiclean Limited (RMCL) inaugurates its 100% EOU Plant at Kovilpalayam Coimbatore
- 2004** Roots Cast Private Limited (RCPL) inaugurates its Unit II at Arugampalayam Coimbatore
- 2004** Roots Auto Products Pvt Ltd (RAPPL) expands with its Machining Division at Arugampalayam, Coimbatore
- 2004** RIL successfully launches its Malaysian Plant
- 2004** The group company American Auto Service is accredited with ISO 9001 : 2000
- 2005** Roots Industries Ltd., is certified with MS 9000, a pre-requisite for Q1 award for Ford Automotive Operation Suppliers. Focus on Systems and Processes
- 2005** Roots Metrology & Testing Laboratory has been accredited by National Accreditation Board for testing & calibration in the field of Mechanical – Linear & Angular
- 2005** Roots Industries Ltd., is awarded Q1 by Ford Motor Company
- 2005** Roots Industries Ltd., Horn Division upgraded its ISO : 14001 from 1996 version to 2000 version

Work Culture

Roots have a strong people-oriented work culture that can be seen and felt across all its member concerns. Whether they work in group or in isolation, their effort is well appreciated and achievements well rewarded. They have a sense of belonging and they revel in an environment of openness and trust. Cross-functional teams function as one seamless whole and foster the true spirit of teamwork. Roots as a learning organization systematically train its employees at all levels. Conducted in-house, the training programmes equip them to meet new challenges head on. Employees are encouraged to voice their feelings, ideas and opinions. There is a successful suggestion scheme in operation and best suggestions are rewarded.

Work environment:

Special and conscious efforts are directed towards house keeping of the highest order. Renovation and modernization of office premises and office support systems are carried out on an on going basis.

Training:

Roots believe in systematic training for employees at all levels. As a part of the Organizational Development efforts, training programmes are being conducted in-house, for employees at all levels. In addition, staffs are also sponsored for need based training programmes at leading Management Development Institutes.

Total quality management:

Customer Focus is not merely a buzzword but it has become an important factor of every day work and has got internalized into the work environment. There is an equal emphasis on internal customer focus leading to greater team efforts and better cross-functional relationship.

CHAPTER 2

MAIN THEME OF THE PROJECT

2.1 Objectives of the Project

Primary Objective:

- To analyse the Working capital and Profitability of Roots Industries India Limited.

Secondary Objective:

- To determine the operating and the cash cycle to understand the liquidity position of the firm.
- To determine the Optimal cash balances under certainty and uncertainty using Baumol and Miller Orr model.
- To conduct a time series analysis and project the requirement of optimal cash balances for the firm.
- To conduct a correlation analysis between the return on investments and the profitability ratios of the firm.

2.2 Scope and Limitations

Scope of the study:

The study has been done based on the data taken for five financial years on which, ratio analysis, trend analysis, multi discriminant and correlation analysis were done. Based on the results, suggestions were made which could be considered by the company for the effective management of working capital. Apart from this, the project has the scope of determining optimal cash balances and to determine the nature and strength of relationship between the ROI and profitability ratios of the firm.

Limitations of the study:

The following are the limitations of the study:

- Nature of the data is secondary. The analysis involves investigating published financial statements.
- Financial performance analysis is only a part of the complete analysis of the company.
- The ratios are generally calculated from the past financial statements and thus are no indicators of future.
- The results are only applicable to Roots Industries India Ltd.,
- Price level changes make the interpretations of ratios invalid.

2.3 Methodology

Research design:

A research design is arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in produce.

A study on Working Capital Management in Roots Industries India Limited uses Descriptive cum Analytical Research Design.

Method of data collection:

In this study the secondary data is used.

Secondary data means data that are already available (i.e.) they refers to the data which have already been collected and analyzed by someone else. Secondary data may either be published data or unpublished data.

For the study, the 5 year Annual Reports of Roots Industries India Limited from the financial year 2003-04 to 2007-08 were used.

Tools for data collection:

Analysis the data with some statistical technique is called as data analysis.

The tools for analyzing the data are as follows:

- Ratio analysis
- Trend analysis
- Correlation analysis
- Multi discriminant analysis

2.4 Review of Literature

Hyun-Han Shin and Luc Soenen¹ in their article “Efficiency of Working Capital management and corporate profitability” explains working capital management an integral part of the overall corporate strategy to create shareholder value. They investigated the relation between the firm’s net-trade cycle and its profitability. This relationship is examined using correlation and regression analysis, by industry and working capital intensity. Using a Compustat sample of 58,985 firm years covering the period 1975-1994, they find, in all cases, a strong negative relation between the length of the firm’s net-trade cycle and its profitability. In addition, shorter net trade cycles are associated with higher risk-adjusted stock returns.

Jane M. Cote and Claire Kamm²*Latham* in their article “The Merchandising Ratio: a Comprehensive Measure of Working Capital Strategy” this teaching note has two objectives. First, it explores the limitations of the traditional measures of working capital management presented in the financial ratio analysis component of a typical accounting curriculum. Second, it presents an additional or alternative measure based on early work in the finance literature. Three current asset and liability

¹ Hyun-Han Shin and Luc Soenen (1998) “Efficiency of Working Capital management and corporate profitability”, *Journal of Financial Association*, Winter 1998.

² Jane M. Cote and Claire Kamm Latham(1998) “The Merchandising Ratio: a Comprehensive Measure of Working Capital Strategy”, *Journal of Issues in Accounting* , May 1999, Vol. 14,No.4

accounts are combined into a single “Merchandising Ratio”, which provides a measure of the net effect of a firm’s working capital management strategy. Data from a sample of retailing companies demonstrate how the merchandising ratio can be used to enhance students’ analytical skills.

MARC DELOOF³ in this ‘Does Working Capital Management Affect Profitability of Belgian Firms?’ explain that most firms have a large amount of cash invested in working capital, as well as substantial amounts of short-term payables as a source of financing. For instance, according to the National Bank of Belgium, in 1997 accounts receivable and inventories were respectively 17% and 10% of total assets of all Belgian non financial firms. Accounts payable were 13% of total assets of these firms. It can be expected that the way in which working capital is managed will have a significant impact on the profitability. Accordingly, for many firms working capital management is a very important component of their financial management.

Vishal Gaur, Marshall L. Fisher, Ananth Raman⁴ in their article “An Econometric Analysis of Inventory Turnover Performance in Retail Services” explains the variation of the inventory turnover widely across retailers and over time. This variation undermines the usefulness of inventory turnover in performance analysis, benchmarking and working capital management. They developed an empirical model using financial data for 311 publicly listed retail firms for the years 1987-2000 to investigate the correlation of inventory turnover with gross margin, capital intensity, and sales surprise (the ratio of actual sales to expected sales for the year). The model explains 66.7% of the within-firm variation and 97.2% of the total variation (across and within firms) in inventory turnover.

³MARC DELOOF (2003), ‘Does Working Capital Management Affect Profitability of Belgian Firms?’, *Journal of Business Finance & Accounting*, April/May 2003, 30(3) & (4).

⁴Vishal Gaur, Marshall L. Fisher, Ananth Raman (2005) “An Econometric Analysis of Inventory Turnover Performance in Retail Services”, *Journal of Management Science*, February 2005, Vol. 51,

Brian Flanagan⁵ in this article 'Managing Working Capital' explains the need of working capital cycle. Cash flows in a cycle into, around and out of a business. It is the business' Life blood and every manager's primary task is to help keep it flowing and to use the cash flow to generate profits. If a business is operating profitably, then it should, in theory, generate cash surpluses. If it doesn't generate surpluses, the business will eventually run out of cash and expire. The faster a business expands the more cash, it will need for working capital and investment. Good management of working capital will generate cash and help improve profits and reduce risks.

Maynard E. Rafuse⁶ in the journal 'Impact of Working Capital Management in the Profitability of Hindalco Industries Limited' explains for the successful working of any business organization, fixed and current assets play a vital role. Management of working capital is essential as it has a direct impact on profitability and liquidity. An attempt has been made in this paper to study the working capital components and the impact of working capital management on profitability of Hindalco Industries Limited. The paper also makes an attempt to study the correlation between liquidity, profitability and Profit Before Tax (PBT) of Hindalco. The study is based on secondary data collected from annual reports of Hindalco for the study period 1990 to 2007. The ratio analysis, percentage method and coefficient of correlation have been used to analyze the data. Multiple correlations were used to check the significant impact on the profitability of Hindalco.

Appuhami, B. A Ranjith⁷ in their project "The Impact of Firms' Capital Expenditure on Working Capital Management: An Empirical Study across Industries in Thailand" have explained the purpose of this research is to investigate the impact

⁵ Brian Flanagan (2005), 'Managing Working Capital', Journal of Business Credit, September 2005.

⁶ Maynard E. Rafuse(2008), 'Impact of Working Capital Management in the Profitability of Hindalco Industries Limited', ICFAI Journal of Financial Economics, Dec2008, Vol. 6 Issue 4, p62-72, 11p, 5 charts, 1 graph.

⁷ Appuhami, B. A Ranjith(2008) "The Impact of Firms' Capital Expenditure on Working Capital Management: An Empirical Study across Industries in Thailand" International Management Review; Jun2008, Vol. 4 Issue 1, p11-24, 14p

of firms' capital expenditure on their working capital management. The author used the data collected from listed companies in the Thailand Stock Exchange. The study used Shulman and Cox's (1985) Net Liquidity Balance and Working Capital Requirement as a proxy for working capital measurement and developed multiple regression models. The empirical research found that firms' capital expenditure has a significant impact on working capital management. The study also found that the firms' operating cash flow, which was recognized as a control variable, has a significant relationship with working capital management, which is consistent with findings of previous similar researches. The findings enhance the knowledge base of working capital management and will help companies manage working capital efficiently in growing situations associated with capital expenditure.

C.Sanjeeva⁸ identifies the gross operating cycle and the net operating cycle shows a decreasing trend from 210 to 188 and from 165 to 143 days respectively during the period 2001-2006. For the purpose of working capital management, the working capital and the working capital turnover ratio have been worked out. The debtors turnover ratio and the creditors turnover of the ratio have also been worked out. This project mainly deals with the important component of working capital that is inventory management. For the purpose of inventory control, A class category materials in the ABC analysis, are more important. Therefore they are closely monitored at highest level at very frequent intervals. For VED analysis, V- class materials have to be stocked adequately to ensure the operation of the plant.

⁸ C.Sanjeeva(2007), "A study on Inventory Management at Roots Multiclean Limited, Coimbatore, 2007"

CHAPTER 3
ANALYSIS AND INTERPRETATION

Raw Materials Turnover

Average raw materials

Raw Materials Turnover = ----- * 360

Raw materials consumed

Table 3.1

Table showing the Raw materials turnover of Roots Industries Limited for the period 2004-2008

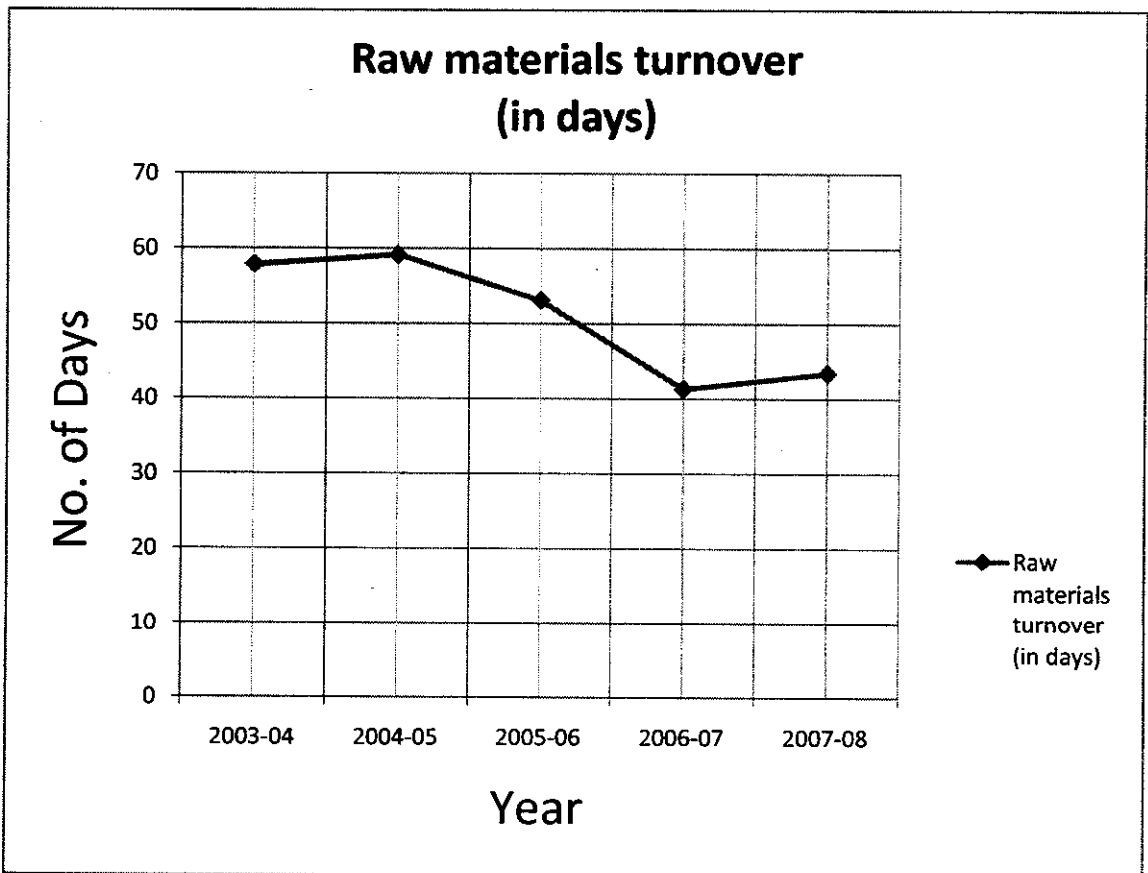
Year	Average raw materials (in Rs.)	Raw materials consumed (in Rs.)	Raw materials turnover (in days)
2003-04	3,13,37,228	19,51,50,032	58
2004-05	4,87,03,375	29,63,19,949	60
2005-06	4,84,13,086	32,84,15,823	54
2006-07	4,34,91,423	37,93,50,324	42
2007-08	5,38,87,853	44,73,79,621	44

Interpretation:

The raw materials turnover indicates the number of days required to convert the raw materials available into consumed raw materials. The turnover increases for the first two years from 2003-04 to 2004-05 and then decreases from 2005-06 to 2006-07. This is because of the decreasing trend in the average raw materials and in the year 2007-08, the raw materials turnover increases because of the continual increase in the consumption of raw materials.

Chart 3.1

Chart showing the Raw materials turnover of Roots Industries Limited for the study period 2004-2008



Work in Progress turnover

$$\text{Work in Progress turnover} = \frac{\text{Average Work in progress}}{\text{Cost of production}} * 360$$

Table 3.2

Table showing the Work in progress turnover of Roots Industries Limited for the study period 2004-2008

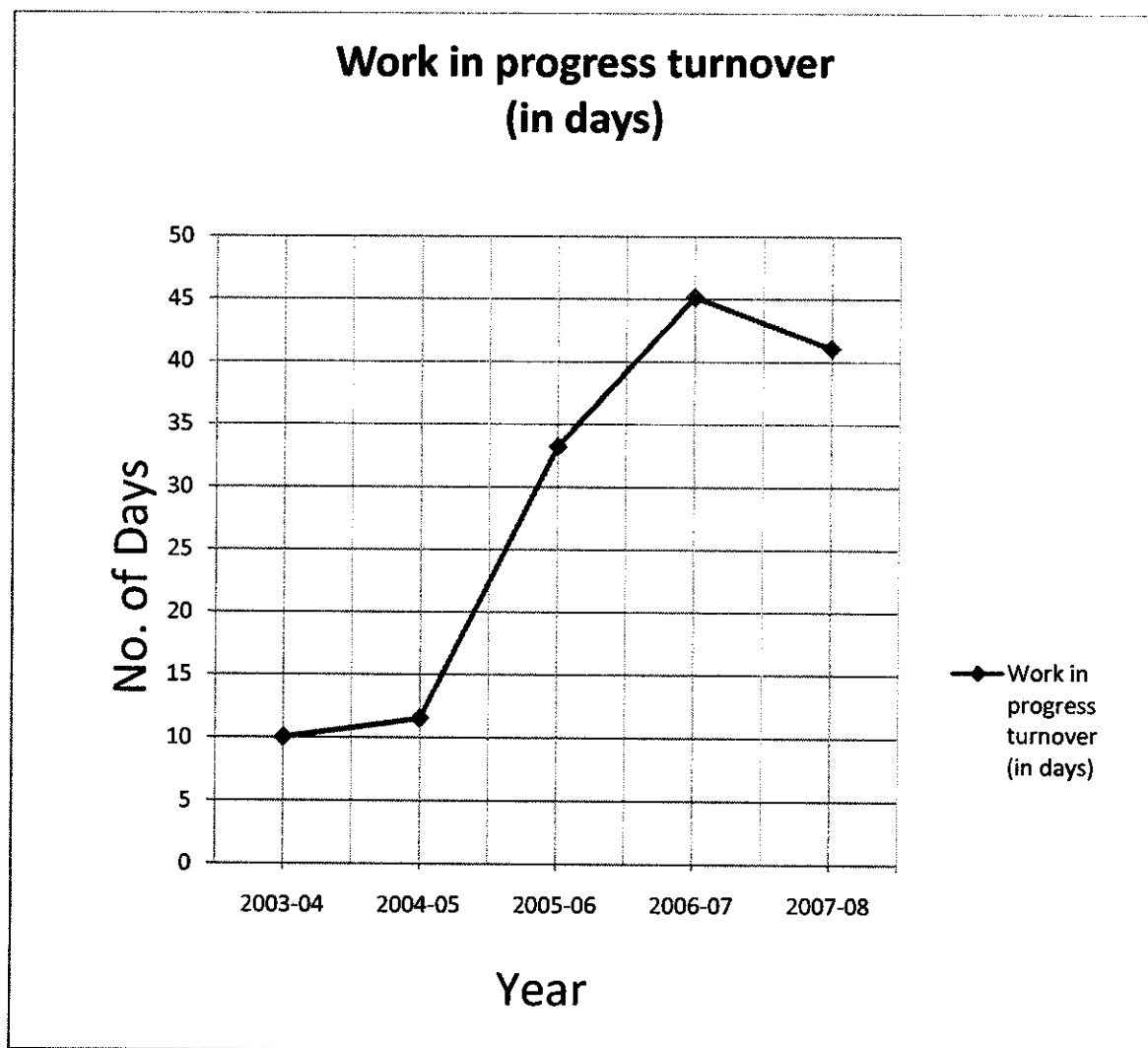
Year	Average work in progress (in Rs.)	Cost of production (in Rs.)	Work in progress turnover (in days)
2003-04	33,96,209	12,19,63,584	11
2004-05	59,65,325	18,61,85,275	12
2005-06	1,17,13,066	12,69,69,655	34
2006-07	1,73,68,657	13,85,17,991	46
2007-08	1,81,78,368	15,94,52,522	42

Interpretation:

The Work in progress turnover indicates the number of days required for the materials to be converted into finished goods or under process. The work in progress shows a continuous increase from 2003-04 to 2006-07 and during 2007-08 it has been reduced due to the increase in the cost of production.

Chart 3.2

Chart showing the Work in progress turnover of Roots Industries Limited for the study period 2004-2008



Finished Goods Turnover (FGT)

Average finished goods

$$\text{Finished Goods Turnover} = \frac{\text{Sales}}{\text{Average finished goods}} * 360$$

Table 3.3

Table showing the Finished goods turnover of Roots Industries limited for the study period 2004-2008

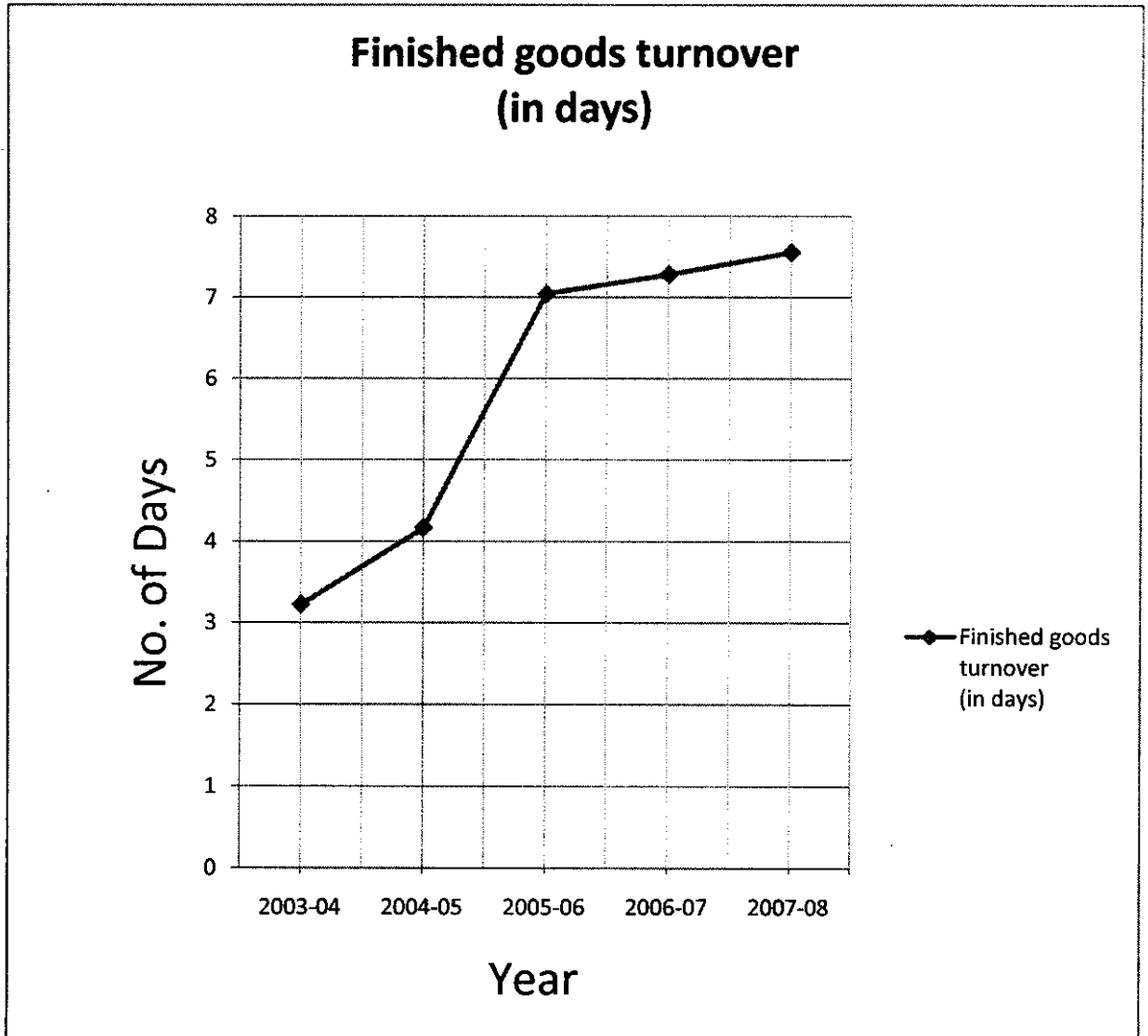
Year	Average finished goods (in Rs.)	Sales (in Rs.)	Finished goods turnover (in days)
2003-04	39,57,196	44,12,93,508	4
2004-05	73,30,595	63,36,52,464	5
2005-06	1,26,10,834	64,45,27,713	8
2006-07	1,54,25,764	76,22,46,062	8
2007-08	1,87,51,582	89,34,03,835	8

Interpretation:

The finished goods turnover indicates the period it requires for converting the finished goods inventory to sales or how quick the firm is able to convert the goods into sales. The firm shows a continuous increase for the study period from 2003-04 to 2007-08. The finished goods turnover increases from 4 to 8 days. This is mainly because of the increase in the average finished goods inventory.

Chart 3.3

Chart showing the Finished goods turnover of Roots Industries limited for the study period 2004-2008



Collection Period

The collection period is very much the vital part of the working capital management. The collection period indicates how efficient the firm able to convert its average receivables into cash or in simple terms how efficient the collection terms of the firm. The lesser the collection period, more efficient the firm becomes. Average receivable is the amount that has to be collected from the sale of the product that has been sold on credit terms.

$$\text{Collection period} = (\text{Average receivables} / \text{Sales}) * 360$$

Table 3.4

Table showing the Collection Period of Roots Industries Limited for the study period 2004-2008

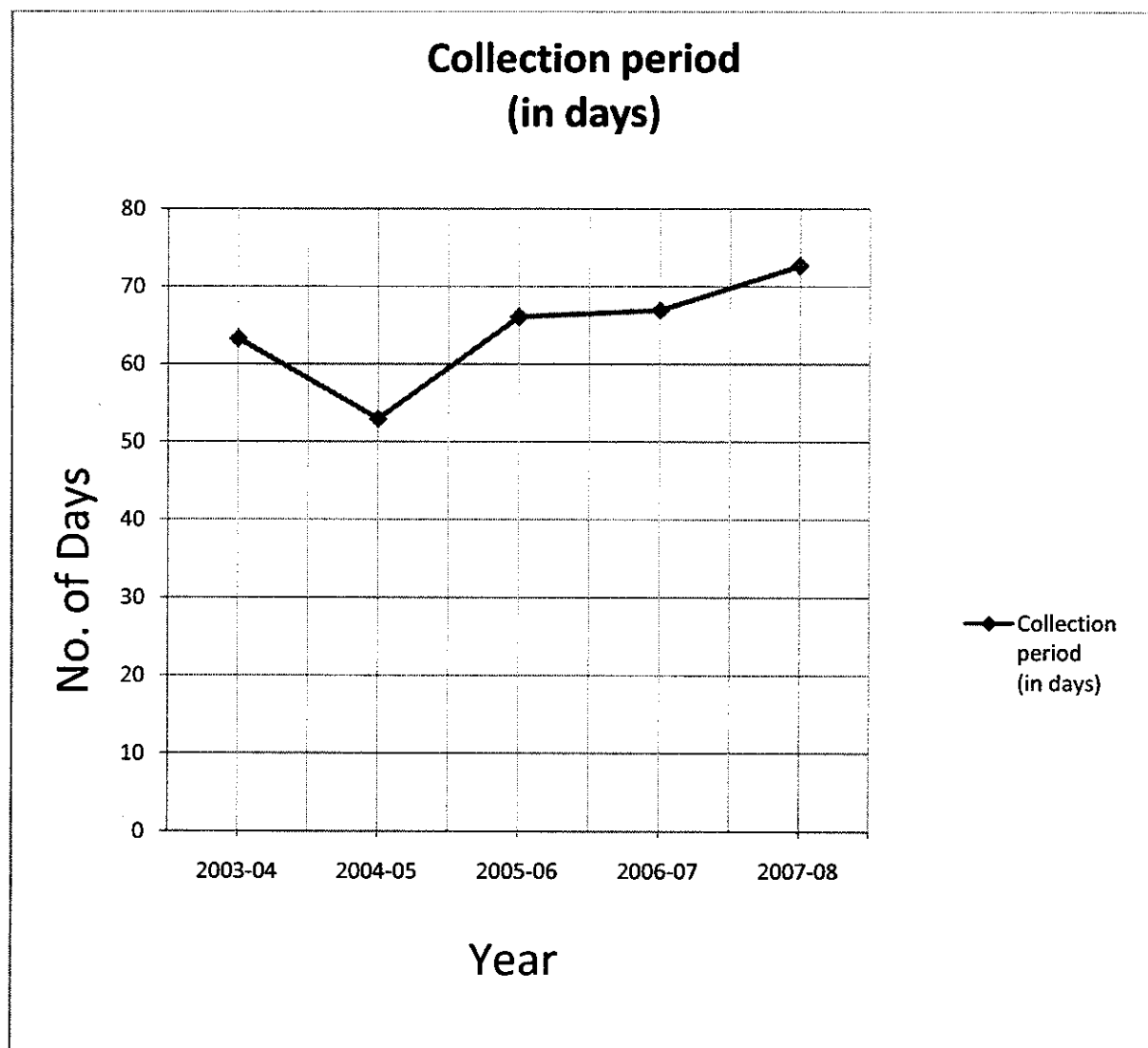
Year	Average receivables (in Rs.)	Sales (in Rs.)	Collection period (in days)
2003-04	7,75,49,561	44,12,93,508	64
2004-05	9,31,76,674	63,36,52,464	53
2005-06	11,82,48,140	64,45,27,713	67
2006-07	14,16,28,326	76,22,46,062	67
2007-08	18,02,16,918	89,34,03,835	73

Interpretation:

The collection period shows an increasing trend towards the end of the study period which has been from 2003-04 to 2007-08. The collection period has increased from 53 days in 2004-05 to 73 days in 2007-08. This is mainly due to the heavy increase in the average receivables towards the end of the study period.

Chart 3.4

Chart showing the Collection Period of Roots Industries Limited for the study period 2004-2008



Payment period

The Payment period indicates the velocity with which the creditors are turned over in relation to purchases. Generally, higher the creditors velocity better it is or otherwise lower the creditors velocity, less favorable.

$$\text{Payment Period} = (\text{Average Creditors} / \text{Purchases}) * 360$$

A higher payment period implies greater credit period enjoyed by the company. Sometimes higher ratio also implies lesser discount availed or higher prices paid for the good purchases on credit.

Table 3.5

Table showing the Payment Period of Roots Industries Limited for the study period 2004 - 2008

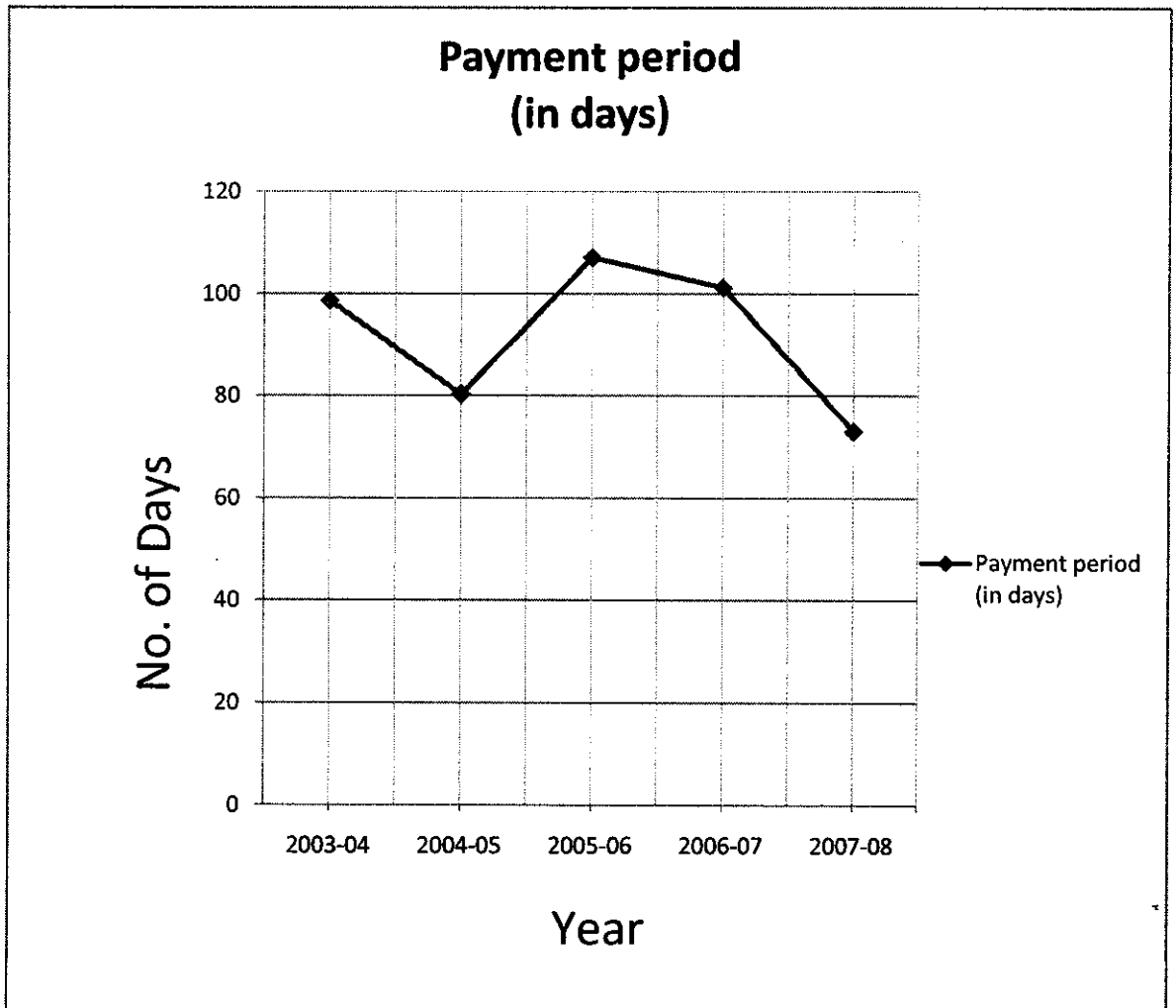
Year	Average creditors (in Rs.)	Purchases (in Rs.)	Payment period (in days)
2003-04	5,83,10,019	21,28,26,062	99
2004-05	7,22,08,334	32,39,81,855	81
2005-06	9,72,30,500	32,68,96,960	108
2006-07	11,20,29,822	39,86,09,793	102
2007-08	9,23,02,031	45,52,88,694	73

Interpretation:

The payment period was in the average of 92 days from 2003-04 to 2007-08. During 2003-04 the payment period lies at the above average and on the subsequent year the payment period falls below the average and maintains thereafter almost. With the steady increase in the average creditors and with the increase in the purchases, the payment period shows a positive trend and in 2007-08 the trend

Chart 3.5

Chart showing the Payment period of Roots Industries Limited for the study period 2004-2008



Cash cycle and Operating cycle

In a manufacturing firm, the working capital cycle starts with the purchase of raw materials and ends with the realization of cash from the sales of finished products. This operating cycle involves purchase of raw materials and stores, its conversion into stocks of finished goods through work in progress, conversion of finished goods into sales, debtors and receivables and ultimately realization of cash and again this cycle continues from cash to purchase of raw materials.

**Operating cycle = Raw materials turnover + Work in progress turnover +
Finished Goods turnover + Collection period.**

Cash cycle = Operating cycle – Payment period

Table 3.6

Table showing the Cash cycle and the Operating cycle of Roots Industries Limited for the study period 2004-2008

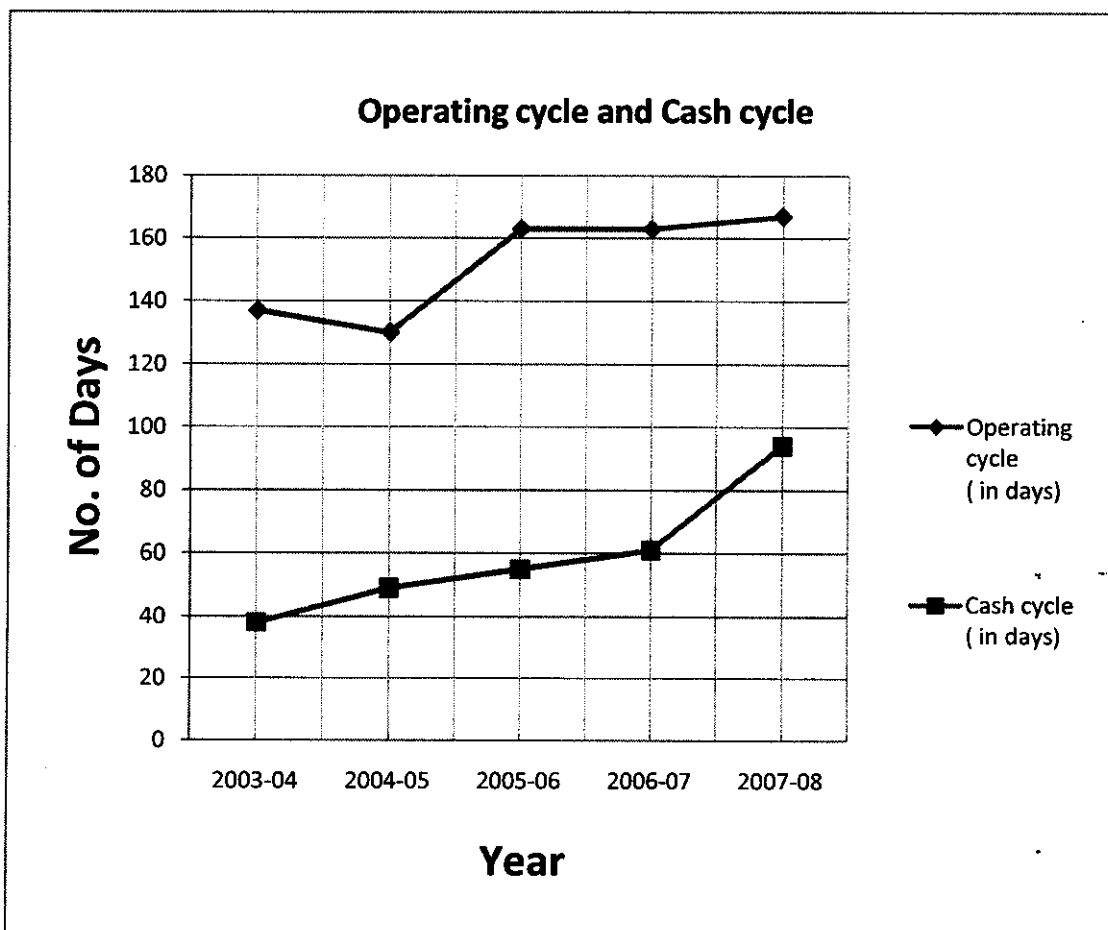
Year	Operating cycle (in days)	Payment period (in days)	Cash cycle (in days)
2003-04	137	99	38
2004-05	130	81	49
2005-06	163	108	55
2006-07	163	102	61
2007-08	167	73	94

Interpretation:

The operating cycle and the cash cycle shows a steady increase for the study period from 2003-04 to 2007-08. The operating cycle shows an increasing trend mainly because of the steady increase in the finished goods turnover and the cash cycle shows a steady increasing trend due to the decrease in the payment period. During 2007-08, the payment period reduces to 73 days thus increasing the cash cycle further.

Chart 3.6

Chart showing the Cash cycle and the Operating cycle of Roots Industries Limited for the study period 2004-2008



Gross Working and Net Working Capital

The Gross working capital represents the amount of funds invested in current assets or in other words the capital invested in the total current assets of the enterprise.

**Gross Working capital = Total Current Assets (or) Inventories + Sundry debtors
+ Cash and balances + Investments + Other current assets**

The Net working capital refers to the excess of current assets over current liabilities. When the current assets exceeds the current liabilities the working capital is positive and the negative working capital results when the current liabilities are more than the current assets.

Net Working capital = Current assets – Current liabilities

Table 3.7

Table showing the Gross Working and Net Working Capital of Roots Industries Limited for the study period 2004-2008

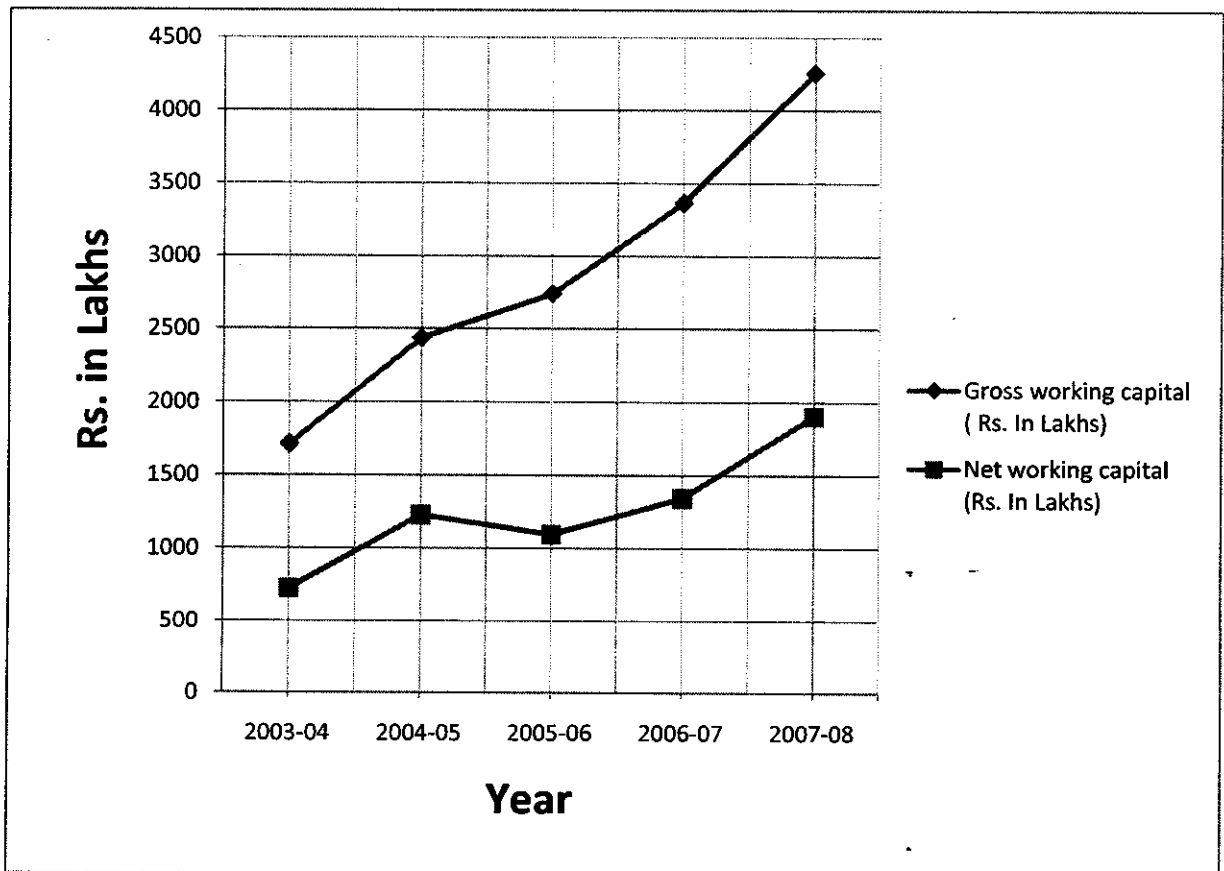
Year	Gross working capital (Rs. In Lakhs)	Net working capital (Rs. In Lakhs)
2003-04	1711.8	725.4
2004-05	2437.63	1228.38
2005-06	2738.68	1094.77
2006-07	3364.97	1343.13
2007-08	4257	1904.22

Interpretation:

The Gross working capital shows a gradual increase from 2003-04 to 2007-08. This shows the firm has constantly increasing its current assets value by means of investments and also with the increase in the debtors. The net working capital increases from Rs.725.4 lakhs in 2003-04 to Rs.1228.38 lakhs in 2004-05 and decreases to Rs.1094.77 lakhs, this is mainly due to the increase in the current liabilities during that period and from there onwards it shows a healthy positive trend.

Chart 3.7

Chart showing the Gross Working and Net Working Capital of Roots Industries Limited for the study period 2004-2008



Cash Turnover Ratio and Cash Turnover Period

The Cash turnover ratio indicates the number of times the company's cash is used efficiently. The cash turnover period indicates the number of days in need to get the required cash out of sales.

$$\text{Cash turnover ratio} = (360 \text{ days} / \text{Cash cycle})$$

$$\text{Cash turnover period} = (\text{Cash} / \text{Sales}) * 360$$

Table 3.8

Table showing the Cash Turnover Ratio and Cash Turnover Period of Roots Industries Limited for the study period 2004-2008

Year	Cash turnover ratio	Cash turnover period (in days)
2003-04	9.47	3.62
2004-05	7.35	4.83
2005-06	6.55	4.15
2006-07	5.90	4.1
2007-08	3.83	2.37

Interpretation:

The Cash turnover ratio of the firm shows a steady decrease during the study period from 2003-04 to 2007-08. The cash turnover ratio decreases from 9.47 in 2003-04 to 3.83 in 2007-08. This is mainly due to the increase in the cash cycle to 94 days in 2007-08 from 38 days during 2003-04.

Chart 3.8

Chart showing the Cash Turnover Ratio of Roots Industries Limited for the study period 2004-2008

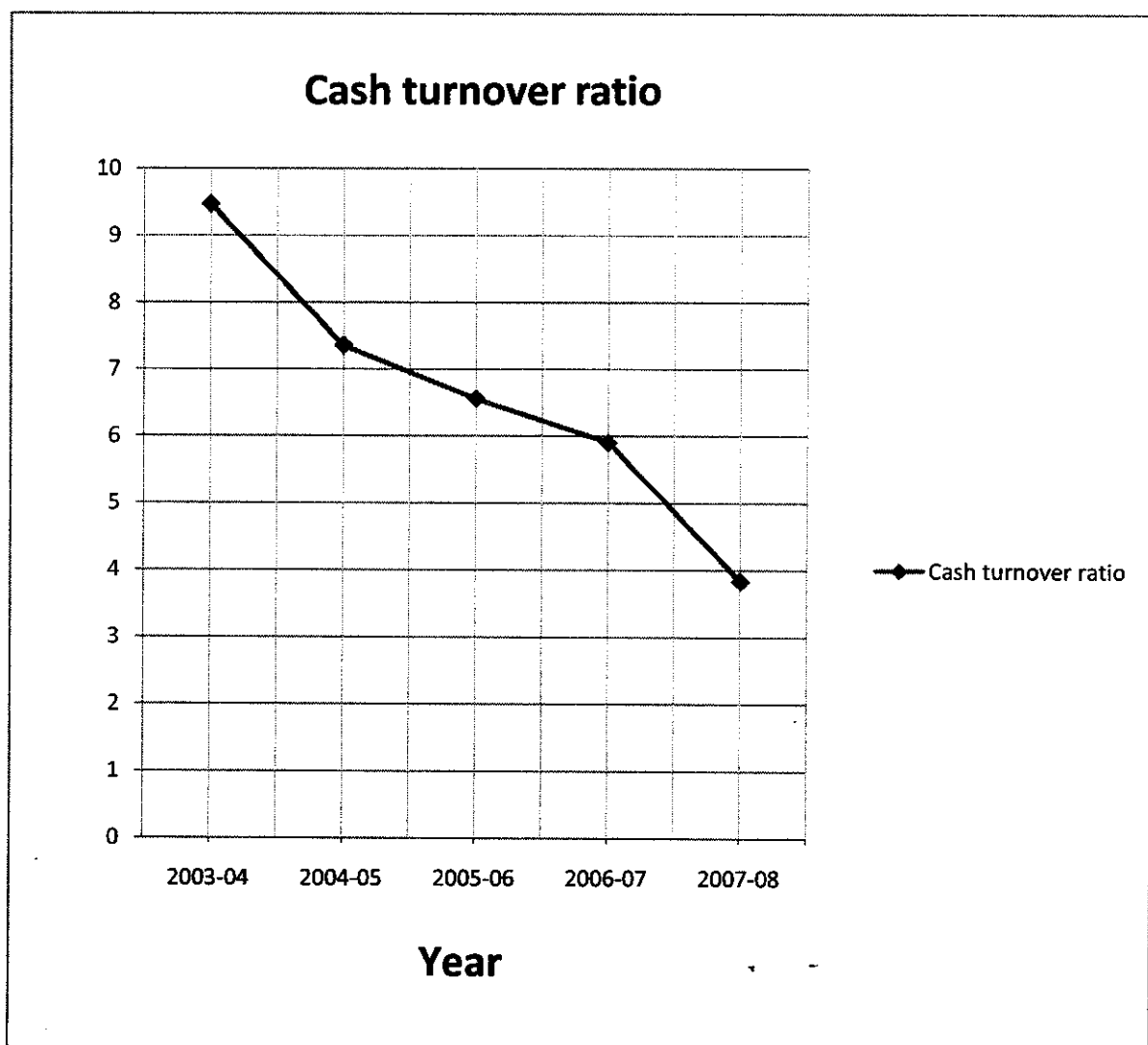
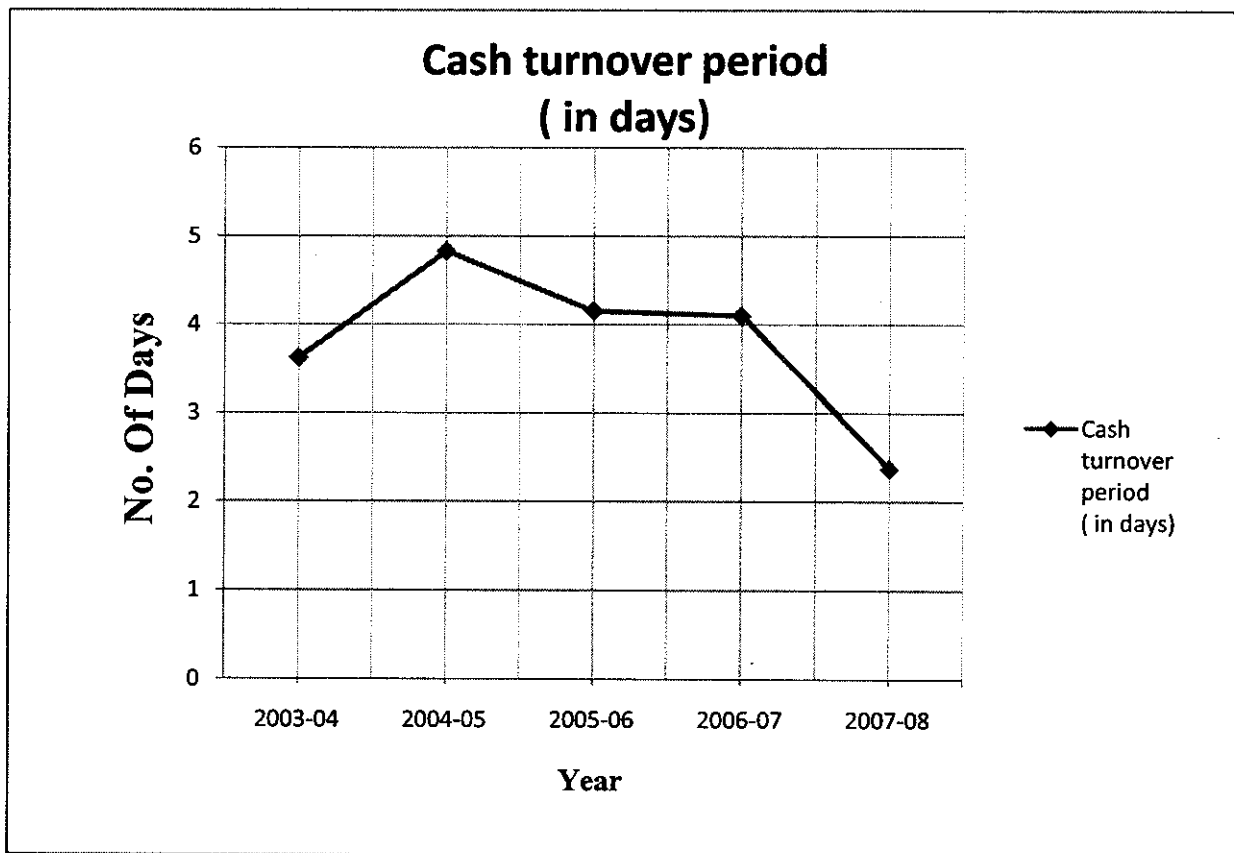


Chart 3.9

Chart showing the Cash Turnover Period of Roots Industries Limited for the study period 2004-2008



Interpretation:

The cash turnover period shows a fluctuating trend during the study period from 2003-04 to 2007-08. During 2003-04 to 2004-05, it increases and then it decreases during the rest of the period under study. The decreasing trend is mainly because of the increase in the sales value. The cash turnover period decreases from 4.83 days in 2004-05 to 2.37 days in 2007-08. However, the firm is able to support the cash needs due to the increase in the sales.

Baumol Model:

The Baumol model has been applied for the Roots Industries Limited for the study period 2004-2008

$$\text{Average cash equivalent balance} = (\text{opening cash equivalent balance} + \text{closing cash equivalent balance})/2$$

$$\text{Total cash requirements (Demand for cash)} = \text{cash for operating activities} + \text{cash for investing activities} + \text{cash for financing activities}$$

$$\text{Conversion cost (C)} = \text{Total cash requirements} / \text{Average cash equivalent balance}$$

$$\text{Optimal Cash balance , } C^* = \sqrt{2 * C * T / K}$$

Where,

T = Total cash requirements

K = Opportunity cost

Table 3.9

Table showing the cash balances and cash demand of Roots Industries Limited for the study period 2004-2008

Year	Baumol Model							Total Requirements (in Rs)
	Opening cash equivalent balance (in Rs)	Closing cash equivalent balance (in Rs)	Average cash balance (in Rs)	Operating activities (in Rs)	Investing activities (in Rs)	Financing activities (in Rs)		
2003-04	70,46,272	44,42,704	57,44,488	3,42,00,737	6,66,81,123	3,54,65,861	13,63,47,721	
2004-05	44,42,702	85,08,617	64,75,659	1,38,50,593	5,56,66,843	7,35,83,349	14,31,00,785	
2005-06	85,08,617	74,41,486	79,75,052	5,57,79,663	2,68,39,710	3,00,07,084	11,26,26,457	
2006-07	74,41,486	86,84,521	80,63,004	2,47,71,146	3,12,88,790	77,60,679	6,38,20,615	
2007-08	86,84,521	58,83,171	72,83,846	1,09,33,975	2,88,36,990	3,69,69,615	7,67,40,580	

Table 3.10

Table showing the Optimal cash balances using Baumol model for Roots Industries Limited for the study period 2004-2008

Year	Conversion cost	Optimal cash balance (in Rs)
2003-04	23.73	2,42,545
2004-05	22.09	2,39,739
2005-06	14.12	1,62,803
2006-07	7.92	82,095
2007-08	10.535	1,21,241

Miller-Orr Model:

Minimum cash balance (constant assumed) = Rs. 1,00,000

Standard deviation of daily net cash flows = Rs. 50,000

Distance between upper limit and lower limit = Z

$Z = \text{cubic root of } (\frac{3}{4} * (\text{conversion cost} * \text{variance of daily net cash flows} / \text{daily opportunity cost}))$

Upper limit = Lower limit + 3 Z

Return point = Lower limit + Z

Average cash balance = Lower limit + (4/3) Z

Table 3.11

Table showing the average cash balances using Miller-Orr model for Roots Industries Limited for the study period 2004-2008

Year	Interest rate (in %)	Value of Z (in Rs.)	Upper limit (in Rs.)	Return point (in Rs.)	Average Cash balance (in Rs.)
2003-04	11	58,172	2,74,516	1,58,172	1,77,563
2004-05	11.25	56,800	2,70,399	1,56,800	1,75,733
2005-06	12	47,530	2,42,588	1,47,529	1,63,373
2006-07	15	36,388	2,09,164	1,36,388	1,48,517
2007-08	11	44,173	2,32,520	1,44,173	1,58,898

Projected Optimal cash balance under Baumol and Miller-Orr model using Trend Analysis:

Trend is a long term movement in time series value of the variable (y) over a fairly long period of time. The variable y is the factor which we are interested in evaluation for future. If trend can be determined and rate of change can be ascertained, then tentative estimates on same series value into future can be made.

Table 3.12

Table showing the Optimal Cash Balance and projected cash balances under Certainty and Uncertainty of Roots Industries Limited for the study period 2004-2008

Year	Operating cycle (in days)	Baumol model		Miller – Orr model	
		Optimal cash balance under Certainty		Average cash balance under uncertainty	
		Optimal cash balance per year (in Rs.)	Optimal cash balance for operating cycle (in Rs.)	Average cash balance per year (in Rs.)	Average cash balance for operating cycle (in Rs.)
2003-04	137	2,42,544.5	91,037.25	1,77,562.5	66,646.75
2004-05	130	2,39,738.35	85,386.26	1,75,732.8	62,589.76
2005-06	163	1,62,802.82	72,703.73	1,63,372.50	72,958.13
2006-07	163	82,094.195	36,661.24	1,48,517.04	66,324.05
2007-08	167	1,21,240.708	55,471.78	1,58,897.94	72,701.25
		Trend Analysis			
2008-09	180	87,573	43,187	1,45,453	71,730.25

Interpretation:**Optimal cash balance for Baumol model**

The Baumol model shows the actual cash flows and the optimal cash balances during the years from 2003-04 to 2006-07 has been in the decreasing trend and also the trend analysis have predicted the optimal cash balance during 2008-09 will be around Rs.43,187 for an operating cycle of 180 days. This gives the firm the idea of how much to keep for the upcoming operating cycle.

The operating cycle for the study period from 2003-04 to 2007-08 has been constantly increasing from 137 to 167 days. The optimal cash balance per year is getting decreased from 2003-04 to 2006-07 from almost Rs. 2,42,545 to Rs. 82,095. The year 2007-08 has shown again the increase in the optimal cash balance of Rs.1,21,241 for the year indicating the cash balances of the company has gone up.

Average cash balance for Miller-Orr model

The Miller-Orr model shows the uncertain cash flows and the average cash balances during the years from 2003-04 to 2006-07 has been in the decreasing trend and also the trend analysis have predicted the average cash balance during 2008-09 will be around Rs.71,730.25 for an operating cycle of 180 days. This might give the firm a fair idea of how much to be arranged for the operating cycle considering uncertainties.

The Miller Orr model also gives an outline on the average cash balances from 2003-04 to 2007-08 on considering the uncertainties prevailing in the industry.

Multi Discriminant Analysis

$$Z = 1.2 X_1 + 1.4 X_2 + 3.3 X_3 + 0.6 X_4 + 1.0 X_5$$

Table 3.13

Table showing the Multi discriminant analysis of Roots Industries Limited for the study period 2004-2008

Year	2003-2004		2004-2005		2005-2006		2006-2007		2007-2008		Percent age total of ratios in Z score from 2004-2008	Rank
	Value of ratios	% of ratios in Z score	Value of ratios	% of ratios in Z score	Value of ratios	% of ratios in Z score	Value of ratios	% of ratios in Z score	Value of ratios	% of ratios in Z score		
X ₁	0.254	7.96	0.313	11.1	0.247	8.75	0.27	8.72	0.317	10.33	46.86	3
X ₂	0.073	2.28	0.016	0.60	0.052	1.76	0.052	1.70	0.049	1.60	7.94	5
X ₃	0.173	5.42	0.119	4.21	0.159	5.40	0.162	5.23	0.153	4.98	25.24	4
X ₄	1.128	35.36	0.683	24.22	0.988	33.50	1.113	35.95	1.05	34.20	163.23	2
X ₅	1.543	48.36	1.617	57.34	1.46	49.50	1.503	48.55	1.49	48.53	252.28	1
Z	3.19	100	2.82	100	2.95	100	3.096	100	3.07	100		

X₁ = Working capital to total assets ratio; X₂ = Retained earnings to total assets ratio; X₃ = EBIT to total assets ratio;

X₄ = Market value of equity to total debts ratio; X₅ = Sales to total assets ratio

Interpretation:

Z ratio is the overall index of the multi discriminant function. The Z score ranges almost three for the five years under study from 2003-04 to 2007-08. During the year 2004-05, Z score dropped a little below three due to the decrease in the retained earnings and the earnings before interest and tax. On an average, Z score is healthy and the firm is in good condition, there is no concern for bankruptcy for the firm.

It is also evident that the Working capital to total assets ratio ranks 3 for the percentage contribution in the Z score after sales to total assets and market value of equity to total debts ratio.

Chart : 3.10

Chart showing the Multi Discriminant Analysis of Roots Industries Limited for the study period 2004-2008

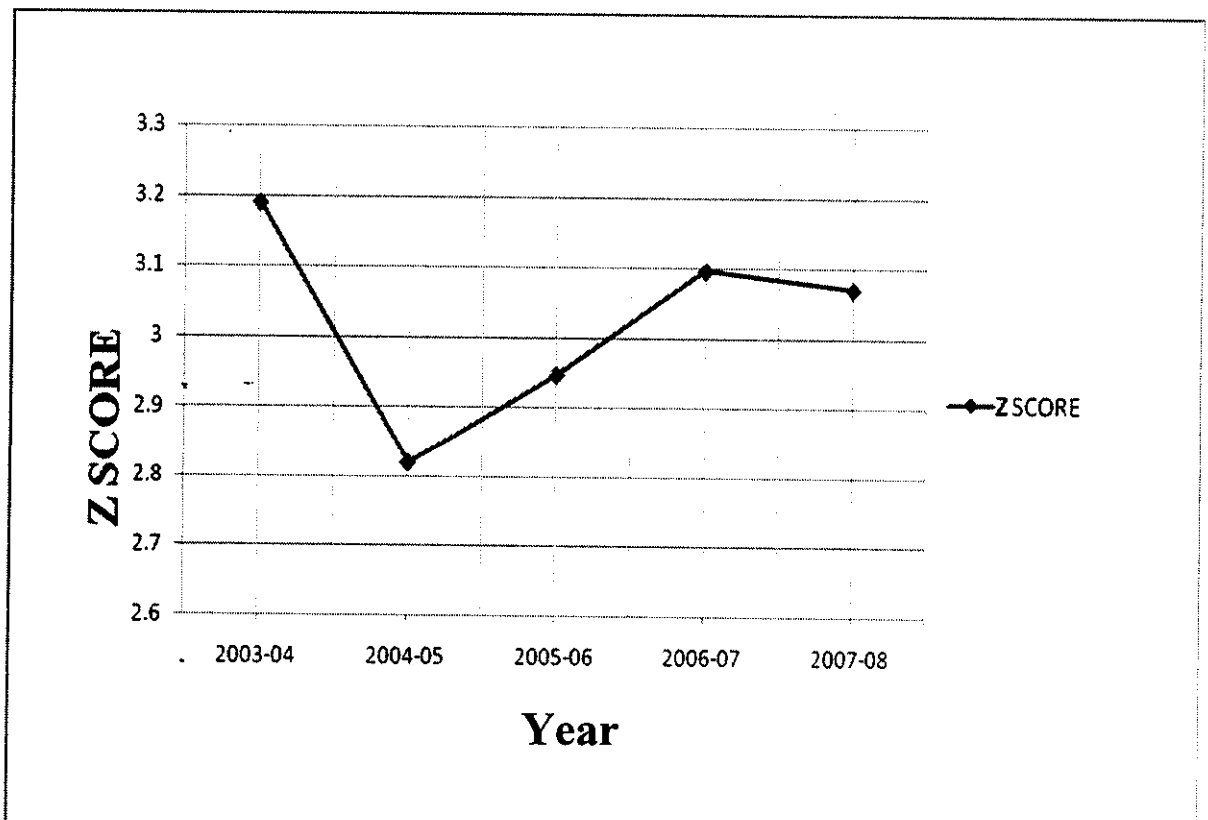


Table 3.14

Table showing the Working Capital, Acid Test and Current Assets to Total Assets Ratio of Roots Industries Limited for the period 2004-2008

Year	Working capital ratio	Acid test ratio	Current assets to total assets ratio
2003-04	1.85	1.27	0.55
2004-05	2.16	1.39	0.58
2005-06	1.73	1.25	0.59
2006-07	1.72	1.24	0.63
2007-08	1.87	1.39	0.68

Table 3.15

Table showing the Current Assets to Sales, Working Capital Turnover and Inventory Turnover Ratio of Roots Industries Limited for the period 2004-2008

Year	Current assets to sales ratio	Working capital turnover ratio	Inventory turnover ratio
2003-04	0.36	6.08	8.86
2004-05	0.36	5.15	7.83
2005-06	0.4	5.89	8.94
2006-07	0.42	5.68	8.55
2007-08	0.46	4.69	8.65

Table 3.16

Table showing the Debtors Turnover, Creditors Turnover and Return on Investments of Roots Industries Limited for the period 2004-2008

Year	Debtors turnover ratio	Creditors turnover ratio	Return on investments
2003-04	5.76	3.65	1.62
2004-05	5.76	4.48	0.67
2005-06	5.08	3.36	1.83
2006-07	4.87	3.55	2.08
2007-08	4.38	4.93	2.13

Table 3.17

Table showing the Correlation Matrix for the ratios of Roots Industries Limited for the period 2004-2008

	WCR	ATR	CTTR	CTSR	WCTR	ITR	DTR	CTR	ROI
WCR	1								
ATR	0.797	1							
CTTR	-0.217	0.352	1						
CTSR	-0.457	0.140	0.961	1					
WCTR	-0.480	-0.882	-0.743	-0.560	1				
ITR	-0.860	-0.640	0.028	.300	0.501	1			
DTR	0.512	-0.073	-0.940	-0.995	0.506	-0.339	1		
CTR	0.630	0.961	0.554	0.362	-0.994	-0.512	-0.289	1	
ROI	-0.884	-0.443	0.587	0.773	0.063	0.778	-0.793	-0.200	1

Correlation is significant at the 0.05 level (2-tailed)

Interpretation:

ROI Vs WCR

The co-efficient of correlation between selected ratios relating to working capital management and ROI are presented in Table 1. It is evident from the table the correlation coefficient between ROI and WCR is (-) 0.88. It indicated that there is a higher degree of negative association between the profitability and the working capital ratio of the company.

ROI Vs ATR

The value of the correlation coefficient is found to be significant at 5 percent level. Similarly, the correlation coefficient between ROI and ATR is (-) 0.44 which is found to be significant at 0.05 level. It reveals that there is also a lower degree of negative correlation between the two variables. It is evident from these two ratios that the amount of current and liquid assets increases risk as well as affects profitability.

ROI Vs CTTR

The coefficient of correlation between ROI and CTTR is (+) 0.58. It implies that there is a positive correlation between the two variables, at 5 percent level, the value of the correlation coefficient is found to be significant.

ROI Vs CTSR

The coefficient of correlation between CTSR and ROI is (+) 0.77 which is found to be significant at 5 percent level. It reflected a higher degree of positive association between the two variables. Simply, the higher the current assets to sales ratio, the lesser the efficiency of the working capital and the wide scope of profitability.

ROI Vs WTR

The correlation coefficient between ROI and WTR is (+) 0.34, which indicates a lower degree of positive correlation between these two variables. This value is found to be significant at 0.05 level. The steady movement of working capital turnover, the higher investment and greater is the profitability conforms to principle.

ROI Vs ITR

The co-efficient of correlation between ROI and ITR is found to be (+) 0.77, viewing a higher degree of positive correlation between the variables. Seventhly, the co-efficient of correlation between ROI and DTR shows negative association of (-) 0.79. Lastly, the co-efficient of correlation between ROI and CTR viewing assorted low degree of negative association. This correlation is very insignificant.

Hence, the study of the impact of working capital ratios on profitability viewed both negative and positive impacts. The study of the relationship between the profitability and working capital, ratio conforms to accepted rule that larger the turnover, increases the profitability of the company.

CHAPTER 4

Findings, Suggestions and Conclusion

Findings

1. The lower the Raw Materials turnover towards the end of the study period at 42 days in 2006-2007 and at 44 days in 2007-2008 may attribute to the quicker conversion of raw materials.
2. The increase in the work in progress turnover (around 40 days) during 2006-2007 and 2007-2008 indicates the average work in progress increases, as it is mainly due to the agile production activities.
3. The finished goods turnover has been increased from 4 days to 8 days from 2003-2004 to 2007-2008. This is mainly due to the percentage increase in the average finished goods as compared to the percentage increase of the sales during the study period.
4. The collection policy of the firm is found to be fluctuating between 53 to 73 days and it is also on the increasing trend, so there is no standard policy regarding the collection terms.
5. The payment period is found to be increasing from 81 days in 2004-2005 to 102 days in 2006-2007 and it has reduced to 73 days in 2007-2008 this is mainly due to the decrease in the average creditors during 2007-2008.
6. The longer payment period is the privilege of the company it enjoys over its suppliers. Due to the competition in the market the creditors are extending good credit terms which are favorable to the company.
7. The operating cycle of the firm has been on the increasing trend from 2003-2004(137 days) to 2007-2008(167 days). The increase in the finished goods turnover influences the operating cycle of the firm.
8. The cash cycle of the firm has been on the upper trend from 38 days to 94 days during the study period. This is mainly because of the increase in the

operating cycle; the firm takes longer time to conversion of purchase of raw materials to the sale of the finished goods.

9. The gross working and net working capital of the firm is on the raising trend from 2003-2004 to 2007-2008. This shows the firm is actively investing in the current assets and effectively manages the current liabilities.
10. The cash turnover ratio of the firm shows a steady decrease during the study period and it has been mainly due to the increase in the cash cycle in the direct way and in the other sense the longer time period for the operating cycle has also been attributing to this trend.
11. The cash turnover period shows a fluctuating trend from 4.83 days to 2.37 days. This is mainly due to the variation in the sales value. But still the firm is able to meet its cash requirements from sales. This shows a healthy position of the firm.
12. The Baumol model shows the decreasing trend of the optimal cash balances during the study period and also offers the projected optimal cash balance (Rs 87,573) for 2008-2009.
13. The trend analysis for the operating cycle has predicted 180 days as the operating cycle period and its interpretation over the Baumol model gives the projected optimal cash balance of Rs. 43,183 for the operating cycle during 2008-2009.
14. The Miller-Orr model with its uncertain cash flows has given the increasing trend of average cash balances during the study period and also has predicted Rs 71,730 for the operating cycle of 180 days for 2008-2009.
15. From the multi discriminant analysis, the Z score for the firm averages around 3, indicates healthy position of the firm and there is no need of fear about bankruptcy. This shows the firm is concentrating well on the working capital management and the sales activities.
16. From the Percentage contribution of the ratios to the Z score over the study period suggests the working capital to total assets ratio (46.86% for five years)

has been the third most influencing factor in determining the solvency position using the Z score.

17. Though the working capital turnover ratio seemed to be consistent around 5.50, it has to be improved for effectively managing the working capital.
18. The correlation matrix suggests there is a strong correlation between the return on investment and the profitability ratios. There is a higher degree of negative association (-.88) between the ROI and WCR.
19. There is a lower degree of positive association (.34) between ROI and WTR indicates the steady movement of working capital turnover and the higher investments confirms profitability to the firm.
20. The correlation matrix has also predicted the current assets to sales ratio and the return on investment has got the higher degree of positive association (+0.77). This indicates the return on investment is strongly influenced by the sales and the current assets of the company.

Suggestions

1. The raw materials turnover forms the significant portion of the operating cycle, the operating cycle has to be short enough to indicate the quicker conversion of raw materials in to the work in progress. During the year 2006-07, it has been short in the range of 42 days. The company can work on to achieve the raw materials turnover around 42 days to have a better operating cycle.
2. The finished goods turnover has to be really short in order to have the product converted into sales very quickly. The company enjoyed a good finished goods turnover in 2003-2004(4 days). But during 2007-2008, it has been doubled (8 days). During the year, the average finished goods have to be at Rs. 99,26,709 to achieve the good finished goods turnover of 4 days.

This would have prevented the unnecessary locking up of funds in inventory. The company would have saved **Rs. 88,24,873** during the year

2007-2008. This would also have saved the money that would have been got as a debt for the working capital.

3. For any organization, in order to have healthy day to day operations, the collection period of the company has to be really short. Delay in collection means the depriving of the working capital for the business cycle. This is evident during the year 2004-2005 (53 days), the company enjoyed the benefit of having healthy cash inflows and so the improvement in the working capital position of the firm. In order to achieve the same collection period of 53 days, the average receivables have to be at Rs. 13,15,28,898 during 2007-2008. This would have prevented the unnecessary locking up of funds.

The company have to reduce the average receivables by 27% in order to save **Rs.4,86,88,020**. The company has to adopt strict collection policy to reduce the average receivables to a major extent.

4. The payment period for the company has to be really long, that would enable the company to enjoy the better liquidity position. The company has enjoyed the longer payment period of 108 days in 2005-2006. The company would have saved the huge amount of **Rs.4,42,84,571** if it have kept the average creditors at Rs. 13,65,86,602.

The company has to identify the best supplier with more credit terms and discounts and also the long time association with the supplier would benefit the company enjoying the best supplies with quality and credit terms.

5. The company can make use of the Baumol model under certain cash flows to project the optimal cash balance for 2008-2009. The company can keep the optimal cash balance around **Rs.43,187** for the operating cycle of 180 days during 2008-2009. This would give the company a definitive idea on the cash balances to be held during the next operating cycle.
6. The company can also make use of the Miller Orr model under uncertain cash flows to project the optimal cash balance for 2008-2009. The company can keep the optimal cash balance around **Rs.71,730** for the operating cycle of 180

days during 2008-2009. This would give the company a definitive plan to tackle against the abnormal situations.

7. The Multi discriminant analysis gives the idea regarding the third important factor influencing the solvency position of the company has been the working capital to total assets ratio. This has been evident from the percentage contribution of the ratios in the Z score. So, the company has to maintain around the working capital to total assets ratio in order to have the firm in the healthy position.
8. The Multiple correlation analysis between the return on investments and the profitability ratios will definitely help the firm to identify the degree of association between the variables. The WCR has to be maintained at a level in order to have an optimum ROI to the share holders. These associations between the variables will help the organization to have the clear knowledge about the parameters to have an efficient working capital management.

Conclusion

Based on the above findings, Collection period is little bit high. The receivables have to be collected in time to avoid unnecessary locking up of funds. The Baumol model and Miller Orr model suggests still there is scope for bettering the working capital management by means of the projected optimal cash balances. The firm still has a very healthy Z score and working capital management; there is still scope for improvement for the firm. The firm can make the suggestions to be implemented in order to have a better working capital management. The Correlation analysis also provides the platform for the firm to work out various profitability ratios in relation to working capital management to have an effective control over the working capital. The company can implement the recommended suggestions to further improve its working capital management.

BIBLIOGRAPHY

1. Prasanna Chandra, "Fundamentals of Financial Management", 3rd edition: Tata McGraw-Hill publishing Co, pg : 43-57.
2. R.R. Bari, "Cash Planning and Management": Trivani Publications. Pg:123-168
3. Foster, "Financial Statement Analysis": Pearson Education, pg : 5-45.
4. Brealey, Myers, Allen, Mohanty, "Principles of Corporate Finance": Tata McGraw-Hill publishing Co. pg : 130 – 186.
5. V.K.Bhalla,"Working Capital Management": Anmol Publications Pvt.Ltd.,
6. Harbans Lal Verma,"Management of Working Capital Management ": Deep & Deep Publications
7. MY Khan & PK Jain, "Management Accounting": Tata McGraw-Hill publishing Co. pg :26.3 – 28.24.

JOURNAL REFERENCE:

1. *Hyun-Han Shin and Luc Soenen (1998)* "Efficiency of Working Capital management and corporate profitability", Journal of Financial Association, Winter 1998.
2. Jane M. Cote and Claire Kamm Latham(1998) "The Merchandising Ratio: a Comprehensive Measure of Working Capital Strategy", Journal of Issues in Accounting , May 1999, Vol. 14,No. 2.
3. *Marc Deloof (2003)*, 'Does Working Capital Management Affect Profitability of Belgian Firms?', Journal of Business Finance & Accounting, April/May 2003, 30(3) & (4).
4. *Vishal Gaur, Marshall L. Fisher, Ananth Raman (2005)* "An Econometric Analysis of Inventory Turnover Performance in Retail Services", Journal of Management Science, February 2005, Vol. 51, No2, pp. 181-194.
5. *Brian Flanagan⁵(2005)*, 'Managing Working Capital', Journal of Business Credit, September 2005.

6. *Professor IOANNIS LAZARIDIS, and TRYFONDIS (2006), 'Relationship between Working Capital Management and Profitability of Listed Companies in the Athens Stock Exchange', Journal of Financial Management & Analysis, 19(11):2006:26-35.*
7. *Maynard E. Rafuse(1996), ' Working Capital Management: an urgent need to refocus', Journal of Management Decision, 1996, Vol. 34/2, pp 59-63.*
8. *Cecilia Wagner Ricci and Gail Morrison(1998), 'International Working Capital Practices' Journal of Financial Management Association, Winter 1998.*

WEBSITES:

1. www.rootworldwide.com
2. www.caclubindia.com
3. www.search.ebscohost.com
4. www.citefin.com
5. <http://www.icfai.org/icwai/knowledgebank/fm46.pdf>
6. <http://gbv.sagepub.com/cgi/content/refs/8/2/267>
7. http://en.wikipedia.org/wiki/Working_capital
8. http://en.wikipedia.org/wiki/Z-Score_Financial_Analysis_Tool
9. http://en.wikipedia.org/wiki/Multiple_correlation