Efficiency Ratios of the Plastic Industry of Gujarat (India) During 2001-2010

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Abstract: **In this research paper author have attempted to analyse the profitability aspect of growing sector of plastic industry of Gujarat (India) during 2001- 2010 by taking a sample of 15 public limited listed companies which are working in the Gujarat state region of India on the basis of different size, age, area etc.**

Then the researcher have collected 10 years financial data of these 15 companies for the period 2001-2010 and found out 03 profitability ratios out of it. From all 03 ratios I have worked out composite ratios using ` paid-up capital` as weight and found out weighted mean of these three ratios for 10 years.

Researcher have applied Mann- Kendall Trend detection test to test the hypothesis. The fixed asset turnover ratio increased steadily. The debtor's turnover ratio had declining trend during the decade. The fixed assets turnover ratio had linear rising trend. The trend of the investment turnover ratio during first half of the decade it declined steadily from about 23 to around 14.5 during 2006-07 and than its steadily raised up to the level around 21.

Keywords: **Plastics Industry, Financial Analysis, Composite Ratios, Weighted Mean, Analysis of Variance, Activity Ratios**

I.   INTRODUCTION

Over the years, India has made significant progress in the industrial world with healthy economic growth. On purchase power parity basis, it is one of the top five global economics and is expected to be the third largest by the turn of this decade.

Plastics are one of the fastest growing industries in India. Indian Plastics Industry is expanding at a phenomenal pace. Major international companies from various sectors such as automobiles, electronics, telecommunications, food processing, packing, healthcare etc. have set-up large manufacturing bases in India. Therefore, demand for plastics is rapidly increasing and soon India will emerge as one of the fastest growing markets in the world. The next two decades are expected to offer unprecedented opportunities for the plastic industry in India. This would necessitate industry initiatives to foster investments, expand the market, upgrade quality standards, enhance global participation, encourage Indian industry, to adopt and adapt to world class technology and manufacturing practices.

II.   GROWTH OF PLASTIC INDUSTRY

2.1 Global Scenario

Last few years have been tumultuous for plastics and petrochemical sector due to steep rise in oil prices, which has adversely affected the global economies. However, considering the feed stock advantage and abundance of oil reserves newer petrochemical complexes are being established in Middle-east countries i.e. Oman, Saudi Arabia, UAE, etc. It is projected that, Ethylene capacity in Middle-East would reach to about 35 million tons per annum and Polypropylene (PP) capacity to touch about 7 million tonnes per annum. The US Petrochemical sector may lose Export competitiveness as most of the Ethylene capacities in USA are Ethane based, which are not cost competitive and are capable to produce only Polyethylene (PE). Similarly the revamping of European Petrochemical Complexes would be imperative as they are based on old and expensive technology and are not cost competitive with the Middle-East companies having the biggest

advantage of raw material at their doorstep. China, Middle-East and India would be the major global players, where expansion and augmentation of existing petrochemical capacity would take place in the next 5 years.

Worldwide Plastics Industry witnessed a steady growth in the last decade which is reflected in the increased consumption figures of all types of plastics materials. Asia has been world's largest plastics consumer for several years, accounting for about 30% of the global consumption excluding Japan, which has share of about 6.5%. Next to Asia is North America with 26% share, then Western Europe with 23% share in the global market.

2.2 Indian Plastic Industry

The plastic processing sector in India comprises about 55,000 units employing around 3.6 million people – directly and indirectly; Gujarat contributes about one-fifth of the total number of units in the country. They are involved in producing variety of items through injection moulding, blow moulding, extrusion and calendaring.

The country in general and Gujarat in particular possess necessary technical skills to produce high quality plastic goods, required machinery, efficient moulds and dyes. In view of the versatility of operations and low cost of production, the state has been ideally suited to serve as a sourcing base. Major international companies from various segments of industry including automobiles, electronics and communication, food processing and packaging have set up large manufacturing plants in the country and have helped to develop the market. India is emerging as one of the fastest growing markets and is expected to grow annually by 12 to 15% in the coming years. Indian Plastics Industry gained momentum in early 90's when the economy opened up with liberal industrial policies. Since 2000-01, virgin polymer consumption in the country increased from 3.3 MMT to 7.5 MMT in 2009-10 with annual growth of 9.4%.

Plastics Industries' contribution to India's manufacturing GDP touched around 10% in 2009-10. Polymer demand is expected to touch 16.2 MMT by 2015-16 and 20 MMT by 2020.

2.3 Plastic Industry in Gujarat

The Plastics Industry in Gujarat is one of the oldest in India and among the earliest initiatives towards polymer raw material manufacturing. Majority of India's plastics business revolves around packaging, and as Gujarat contributes 65-70 % to the country's plastics industry, it is home to many small and medium packaging industries. The Plastics Industry in Gujarat contributes 2.17% of India's total exports and is worth $3513 millions.

Thus, so far as growth of Indian economy is concerned, the plastic industry of Gujarat and therefore that of India is making considerable contribution. Therefore, the present study has got motivation from these aspects.

2.4 Some facts about Gujarat

* Gujarat contributes more than 60% of Indian petrochemical industry.
* 70 % of polymers are produced in Gujarat.
* Contributes one-fifth of the total number of SMEs in the plastic sector in the country.
* Gujarat plastic industry is witnessing an annual growth of more than 15 %.
* Gujarat's share in exports of plastic is around 15 %.
* Gujarat share in the production of plastic products is around 14 %.
* Gujarat has the highest plastic machinery manufacturers.

III.   LITERATURE REVIEW

Most of the studies have focused on some aspects of plastic industry like environmental impact of plastic shopping bags, risk faced by plastic industry, adopting new technology in plastic industry, traditional performance index of plastic industry, plastic debris and steps to support and to enable policy makers to develop plastic industry. Very few research works has been done on the field of financial aspect of plastic industry.

Meng-yi Wang (2007) analyzed the issues concerning risk-bearing issue faced by the public listing companies in Taiwan's traditional industries, including the food and plastic industries. The study covered the period from 2001 to 2006, and its results were as follows:

In both the food and plastics industries, if a company had greater operating leverage, it faces greater total risk and specific risk. If the company had greater shareholding ratio of board directors and greater amount of assets, it faces less total risk and specific risk.

Regarding debt ratio of the food industry, if the debt ratio is higher, the total risk and specific risk were higher. The debt ratio had no effect on risk-bearing of the plastics industry. With regards to the shareholding ratio of board directors and quick ratio, the total risk and specific risk were lower in the plastics industry. The shareholding ratio and quick ratio had no effects on the risk-bearing of the food industry.

As for the establishment years of a company, due to the stability and cycle of the products, a food company with longer establishment faces great risks and risk bearing. On the contrary, for a plastics company, the longer it has been established, the lower the risk and risk-bearing it was subjected to.

Povl A Hansen, Goran Serin (1993) showed that development of new materials and material shifts play an increasing role in the development of industrial production. The main issue of this paper was the ability of the industry to adapt to new materials. This study showed that it has been difficult for established firms in Denmark, both within the plastics industry and outside, to undertake shifts in technology. The study also showed that firms most open to material adaptation have been firms based on product ideas not on materials. Another finding was that the Danish plastics industry had been characterized by high growth rates despite low R&D figures. The reasons for these were on the one hand the ability of Danish plastics firms to exploit existing know-how and on the other hand the increased specialization of the firms.

Furthermore the study shows that neither institutional R&D nor institutional education had played any noticable role in the adaptation process of the Danish plastics industry Santanu Mandal (2011) in his study "Porter's Five Forces of Analysis of the Indian Plastic Industry" he has analyzed the plastic industry of India in terms of Michael E. Porter of Harvard Business School in 1979. Porter's five forces are

1. Bargaining power of suppliers

2. Bargaining power of buyers

3. Internal Rivalry

4. Entry

5. Threat of substitutes.

So far as the porter's five forces analysis of this industry is concerned, bargaining powers of suppliers is low while that of buyers is high. Entry is difficult and it entails the incumbent to have significant capital to invest if it wants to enter this industry. On the substitute front, there are lot of researches going on and recent anti plastic campaigns have already given way to many new replacements for plastic as seen above, thereby indicating high threat from substitutes. On the internal rivalry context, the rivalry is high and firms often engage in price wars. It is easy for small firms to change prices and increase market share but the large ones finds difficult to switch quickly. On the whole plastics are essential for today's standard of living and they help in improving the quality of life. It is expected that plastics will continue to grow dynamically.

Hamid Minhas (2006) has drawn overall picture of the growth of Pakistan's economy due to the growth in plastic industry in his study. Pakistan`s economy achieved an impressive GDP growth rate of 8.4% in 2004-05, the highest in two decades and the third fastest growing economy in Asia. Powering the economy with its superb performance, the manufacturing sector accounted for 18.3% of GDP while registering a growth of 12.5%. The co-related industries of Plastic, Printing & Packaging have registered a phenomenal growth during the past few years where printing and graphic arts industries were the second largest industries in terms of work force in Pakistan.

Pakistan's plastic industry was thriving at an average annual growth rate of 15% with a total estimated production capacity of 624,200 M/T per annum. The industry attracted investment amounting to more than US$ 260 billion, almost half of which was foreign direct investment (FDI), all contributing to an exceptional export growth by 35%.

Yuan-Tien Su (2003) investigated whether Economic Value Added (EVA), could be applied for the traditional plastic industry in Taiwan stock market and had better Adjusted R2 with Market Value Added (MVA) than the traditional performance index, and was a better tool in the decision- making of investment by the management and in evaluating the value of an enterprise by the investor.

The following results in this study were obtained:

1. EVA was proved to be highly related and explainable with MVA for the traditional plastic industry in Taiwan.

2. EVA could reflect the operational performance better than RI for the traditional plastic industry in Taiwan.

3. EVA applied for the traditional plastic industry was more appropriate than the traditional performance index in Taiwan.

Dr. Tuong Thi Hoi (2002) analyzed four plastic manufacturing companies, impact on environment, their policies and target, standards of emission, waste water, etc in his study. Plastic Industry Environmental Review: An assessment of the significant environmental aspects and impacts associated with plastic manufacturing in Ho Chi Min city Vietnam, June 2002. Vietnam cleaner production centre. Dr. Tuong Thi Hoi concluded the following:

All four plastic companies have not adopted any of the EMS nor environmental policies, environmental purposes and targets. Companies' managers and staffs are not aware of significant environmental aspects related to their company operation and they do not know which environmental standards on emission, wastewater, noise etc. need compliance.

Tammemagi Hans (1999) "The Waste Crisis: Landfills, Incinerators and the Search for a Sustainable Future" stated that incineration of plastic wastes also significantly reduces the volume of waste requiring disposal. It is said that the volume reduction brought about by incineration ranges from 80 to 95%. It is also a suitable option for disposing waste that cannot be recycled further or is non-recyclable.

D`Mello, Pamela (1998) in their study alerts that faulty and inefficient way of waste management causes severe health problem. It has been observed that due to an inefficient and faulty waste collection and transit system, a large amount of plastic waste fails to reach landfills or incinerators. Instead they are left behind to find their way into the soil, the sewage system and the water bodies. They choke the gutters and drains and during the monsoons flood streets causing severe health problems.

J N Fobil and J N Hogarh (2009) in their study they have suggested the ppp levy system to make the responsible three key stakeholders: the producer of the plastic, the consumer of the plastic and appropriate authorities responsible for plastic waste management. In principle, the proposed PPP levy system spreads the responsibility of management of plastic waste among three key stakeholders: the producers of the plastics (those with high propensity of ending up as litters), the consumers of the plastics and the appropriate authorities responsible for plastic waste management. The concept was to be able to create direct value in plastic wastes such that people will be willing to collect them from the ground. Most waste scavengers in Accra (Ghana), for instance, would quickly pick up metallic waste because locally it has ready market value. It was concluded that itinerant waste buyers would start moving from house to house to buy plastic waste.

Piyush Kunnapallil & Sruthijith K K (2002) the paper examines the viability of the command-and-control approach and that of the market-based alternatives in addressing the environmental problems caused by plastics.

The methodology adopted in this paper was the following. First, the composition and the life cycle of plastics were briefly discussed. Second, the benefits from plastics were elucidated and their inevitability in India established. Third, the ecological harms and health hazards caused by plastics were elaborated. Fourth, the viability of command-and-control measures for addressing these harms and hazards was investigated. Finally, the competence of market-based solutions in this regard was suggested.

IV.   RESEARCH METHODOLOGY

4.1 About the research problem

The present study focuses on Turnovers in Plastic Industry of Gujarat(India) during 2001-2010. One of the major factors affecting the functioning of an industrial unit is the size of that unit. So far as financial analysis is concerned, one of the most important parameters of judging the size of a industrial unit is the paid –up share capital of that unit. Obviously the paid-up share capital may vary from year to year. Therefore it is bound to lead to variation in the functioning, including the financial performance of that unit. Therefore, when certain ratios are considered for judging the financial performance of the unit such ratios must be used along with the paid-up share capital of that unit at that given point of time, particularly when the financial performance is to be studied over the years together. Considering this aspect, in the present study I have tried to innovate in analyzing the ratios by combining them with the paid-up capital, at respective point of

time and working out composite ratios for ten years duration for the companies. Then such composite ratios have been used in carrying out Mann-Kendall trend detection test to test the hypothesis.

4.2 Research Design

The present paper entitled "Efficiency Ratios of the Plastic Industry of Gujarat (India) during 2001-2010", is a descriptive, conclusion oriented and hypothesis testing type of research study. Here the researcher has tried to analyze the financial performance of the selected plastic manufacturing units of Gujarat with the help of liquidity, profitability, activity and solvency ratios.

4.3 Objectives of the study

The main objectives of the present study are as fallows.

- To analyze and evaluate the turnovers of selected companies in particular and the plastic industry in general.

- To study overall financial health of selected plastics manufacturing companies and plastic industry.

- To study the pattern of growth and development of plastic industry in Gujarat.

- To make suggestions/comments about the functioning and development of plastic industry in Gujarat.

4.4 Nature and Sources of data

The present study is mainly based on secondary data that have already been published in annual reports of companies. These data has been collected from annual reports of the selected companies. Further information has been collected from CMIE (Centre for Monitoring Indian Economy) sources, RBI bulletin, annual survey of industries reports of Gujarat State Plastic Manufacturing Association , reports of All India Plastic Manufacturers Association, reports of Indian plastic federation, Life and Health library, libraries of various Institutions, various magazines, journals, research publications, consultants reports and search engines like Money control.com etc.

4.5 Period of Study

The present study covers the period of ten (10) years span from the year 2001 to 2010.

4.6 Sample design

A sample design is a definite plan for obtaining a sample from a given population. It refers to the technique or the procedure the researcher would adopt in selecting items for the sample. Sample design is determined before data are collected. There are many sample designs like random sampling, stratified random sampling, systematic sampling, cluster sampling, two-stage sampling, purposive sampling etc from which I have used convenient random sample for the present study.

4.7 Population

For the present study all the plastics manufacturing (public limited companies) industrial units of Gujarat region which are listed in the Bombay Stock Exchange are the members the population. There were total 77 member companies (public ltd co.) in the GSPMA. Out of them 18 belonging to heavy engineering and metals, cooling and chilling plants, trading companies, which are not directly concerned with plastic manufacturing and some functioning out of Gujarat region were excluded from population. Data of 05 companies were not available. So there were total 55 companies in the population.

4.8 Sampling units and sample size

Out of 55 total numbers of units, I have selected 15 units in a sample on the basis of share capital, annual turnover, installed capacity, total number of workers and the date of incorporation of the company, I have classified all the units of population on the basis of size of the company, age of the company and area of the company. Following table shows the details of the selected companies such as Paid-up Share Capital,   Annual Turnover, Installed capacity, year of incorporation and location.

Table No- 4.8.1

Sr. no	Name of the company	Share Capital (in crore Rs.)	Annual Turnover 2010(in crore Rs.)	Installed Capacity (ton/year)	Incorporation (year)	Location
1.	JBF Industries ltd	31.2	3562.86	3000	1982	Sarigam
2.	Sintex Industries ltd	27.2	2618.85	60000tpa	1975	Kalol
3.	Nilkamal plastics ltd	14.92	1251.70	75120tpa	1985	Rakholi
4.	INEOS ABS industries (India) ltd	17.58	743.13	2000	1973	Baroda
5.	Essel propack ltd	31.31	418.34	5.7 crore units	1984	Vapi
6.	Plastiblends India ltd	6.5	276.90	50000	1991	Daman
7.	Gopala Polyplast ltd	15.51	190.96	489	1984	Kadi
8.	Shaily Engineering plastic ltd	7.32	126.66	NA	1980	Rania, Baroda
9.	Shree Rama Multi-Tech ltd	38.43	96.33	NA	1993	Kalol
10.	Acrysil India ltd	2.97	55.45	220000 units	1987	Bhavnagar
11.	Shree Jagdamba Polymers ltd	0.88	39.44	12000	1984	Ahmedabad
12.	Gujarat craft Industry ltd	3.11	38.99	200	1984	Kadi
13.	Polylink Polymers(India) ltd	15.51	33.36	NA	1993	Dholka
14.	Promact Plastics ltd	6.51	9.40	300	1985	Mehsana
15.	Ashish polyplast ltd	3.4	7.32	850000	1994	Naroda, Ahmedabad

[Source: - Money control.com, The Economic Times]

4.9. Sampling procedure

The present study covers only those companies which are located in Gujarat and listed on the Bombay Stock Exchange. There were 77 companies. Out of which the companies which are not directly concerned with plastic manufacturing have been excluded. In all 18 such companies belong to Heavy Engineering, metals, cooling and chilling, trading companies and some functioning out of Gujarat region were excluded from the population.

The selection of the sample of 15 companies out of 55 companies has been on the basis of following criteria and by the proportional stratified sampling method.

1. Whether the sample represent the companies of different sizes i.e. small, medium and large.

2. Whether the sample represents the companies of different age group.

3. Whether the sample represents the different areas of the company.

Table no-4.9.1

Classification of companies based on different sizes

Size of the company	No. of companies	Sample units
Small	17	4
Medium	17	5
Large	21	6
Total	**55**	**15**

Table No-4.9.2

Classification of companies based on age

Year	No. of companies	Sample units
1951 to 1960	1	-
1961 to 1970	3	-
1971 to 1980	8	3
1981 to 1990	22	8
1991 to 2000	20	4
Total	**54**	**15**

A company incorporated in 1940, has been excluded from the above distribution.

Table No-4.9.3

Classification of companies according to the area or location

Area / Zone	Total no. of companies	Sample units
Ahmedabad	23	4
Baroda	6	2
Mehsana	6	3
Saurashtra	5	1
Panchmahal	6	1
South Gujarat	9	4
Total	**55**	**15**

So the sample represents whole population in terms of sizes, age and area of location.

Table No-4.9.4

Proportion of installed capacity represented by the selected companies

No. of companies	Data available	Total installed capacity of all companies	Total installed capacity of sample units	Percentage of installed capacity of sample
55	55	8.5 MMT	1.5 MMT	17.65

Table no-4.9.5

Proportion of paid up capital presented by the sample companies

No. of companies	Data available	Total paid up capital	Total paid up capital of sample	Percentage of total paid up capital of sample
55	55	3942.48	222.36 crore Rs.	6 %(round of)

The analysis of table –shows that the sample represents companies of different sizes, ages, areas, installed capacity and paid up share capital. Moreover the above mentioned plastic companies have been selected because the data of these companies are available for the entire period of the study.

The total installed capacity of 55 plastic companies, the data of which are available for the study purpose is 8.5 MMT. The total installed capacity of sample units is 1.5MMT. It indicates that the sample represent 17.65 percent of the total capacity of population.

The total paid up capital of the above 55 companies amounted to Rs 3942.48 (Paid-up capital of 20 companies are not available). In comparison to this the total paid up capital of the sample units is estimated about Rs. 222.36 crore which represent about 6 % percent of the total paid up capital. The percentage share installed capacity and paid up capital of sample units justified the selection of sample.

4.10. Tools and techniques

For the purpose of financial analysis of the plastic industry of Gujarat following accounting and statistical tools and techniques are used.

Accounting Technique:

1. Ratio analysis

Statistical technique:

1. Weighted Mean
2. Coefficient of correlation (r)
3. Coefficient of Determination (R^2)
4. Trend Analysis (Mann-Kendall Test)
5. Linear Regression Model

4.11. Scope of the study

This study will serve the following objectives.

- One will have an overview of plastic industry of Gujarat.
- It will throw light on various aspects relating to financial performance of plastic industry of Gujarat.
- It will help in judging the overall financial health of selected plastics manufacturing units and plastic industry.
- It will help in studying the pattern of growth and development of plastic industry in Gujarat.
- It studies the trend of plastic industry in Gujarat

V.   TURNOVER RATIOS (EFFICIENCY RATIOS)

1. Inventory Turnover Ratio

2. Debtors Turnover Ratio

3. Fixed Assets Turnover Ratio

4. Investment Turnover Ratio

5.1 Inventory Turnover Ratio:

Table No.-5.1.1

Composite Inventory Turnover ratio based on Weighted Mean where weight (Wi) are Paid-up capital and Ri are ratios

WiRi

Company	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	∑(wiRi)	∑w	wei $\bar{x}$	$\bar{w}$
IBF	666.620	1177.209	857.703	967.204	1398.071	795.270	10044.096	1621.007	689.619	529.040	18745.839	445.020	42.124	44.502
Sintex	-	88.379	81.099	102.939	115.500	198.681	175.314	319.495	320.576	359.229	1761.212	185.370	9.501	20.597
Nilkamal	75.930	68.474	58.105	60.953	58.876	70.360	62.818	103.262	109.013	103.262	771.034	98.330	7.841	9.853
INEOS ABS	116.974	158.662	156.908	103.781	143.710	158.838	-	-	-	-	838.867	105.540	7.948	17.590
Essel Propack	323.544	278.304	60.216	428.458	237.092	233.334	220.493	227.383	280.940	432.842	2722.607	312.860	8.702	31.286
Plastiblend	-	82.485	58.370	43.095	45.370	45.630	47.125	45.955	49.335	41.535	458.900	58.500	7.844	6.500
Gopala	36.244	121.654	102.913	94.052	136.470	158.865	134.257	149.431	146.015	195.274	1275.155	85.270	14.954	8.527
Shaily	-	-	-	-	62.099	52.031	50.576	61.110	73.639	77.738	377.194	37.920	9.947	6.320
Shree Ram	1191.970	172.780	213.325	189.210	164.035	249.570	283.892	215.650	179.126	191.830	3051.390	286.760	10.641	28.676
Acrysil	14.109	17.502	14.443	9.946	9.817	11.925	12.079	18.063	18.537	16.157	142.578	26.490	5.382	2.649
Jagdamba	-	-	-	-	9.513	10.877	9.064	8.677	10.894	8.782	57.807	5.280	10.948	0.880
Gujarat Craft	13.175	6.811	9.703	15.395	20.522	36.177	34.814	13.435	20.775	10.823	181.630	31.100	5.840	3.110
Polylink	94.062	117.871	130.100	178.107	168.349	171.696	173.867	184.259	344.942	231.254	1794.507	142.600	12.584	14.260
Promact	-	23.621	29.702	28.853	27.150	111.206	63.603	48.760	41.859	30.076	404.810	53.140	7.618	5.904
Ashish	10.302	10.302	9.248	12.274	13.362	17.238	16.830	14.484	16.456	27.642	148.138	34.000	4.357	3.400
∑WjRj	2542.930	2324.055	1781.830	2234.205	2609.938	2321.697	11328.828	3030.972	2301.728	2255.486			11.082	
∑Wj	140.250	169.990	170.010	170.110	183.730	208.460	200.720	220.400	222.210	222.350				
wei $\bar{x}$	18.131	13.672	10.481	13.134	14.205	11.137	56.441	13.752	10.358	10.144	17.146			
$\bar{w}$	14.025	13.076	13.078	13.085	12.299	13.897	14.337	15.743	15.872	15.882				

where, weighted $\bar{x} = \sum(wiRi)/\sum(wi)$ $\bar{w} = \sum wi/n$ n = no. of years

Table No-5.1.2

Year	Composite Ratio of Inventory Turnover	Estimated ratio (from the line)
2000-01	18.13141	15.831
2001-02	13.6717	16.122
2002-03	10.48074	16.413
2003-04	13.13389	16.704
2004-05	14.20529	16.995
2005-06	11.13737	17.286
2006-07	56.44095	17.577
2007-08	13.75214	17.868
2008-09	10.35834	18.159
2009-10	10.14385	18.45

The chart showing the Inventory Turnover Ratios for the industries is presented below.

Chart No.-5.1.3
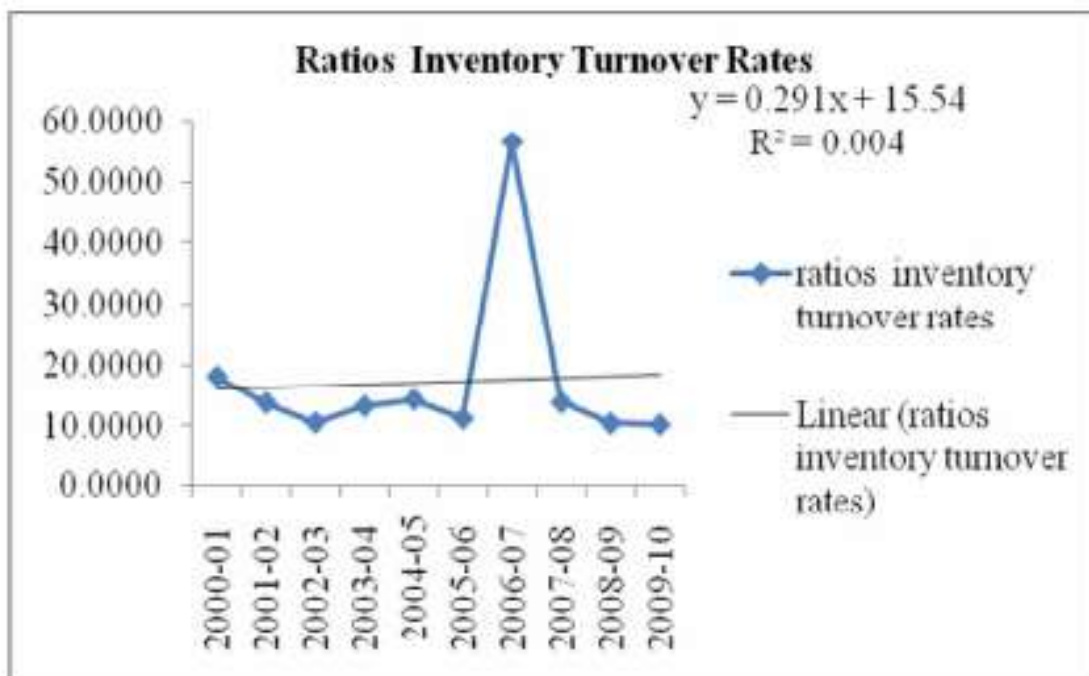
The chart showing the trend in Debtors Turnover Ratios for the industry is presented below.

H0: There is no trend in the series of Composite Inventory Turnover Ratios of the industry.

H1: There is some trend in the series of Composite Inventory Turnover Ratios of the industry.

From the above trend detection test we found that there is no trend. From fitted linear regression line the R^2 value is 0.004, and p-value is 0.099, from which we can say that the model is not good fit.

Conclusion: From the table no. - 5.1.2 and chart no. – 5.1.3 Inventory Turnover ratio was positive during the decade and it was stable in the range of 15.5 to 18.5.

5.2 Debtors Turnover Ratio:

Table No-5.2.1

Composite Debtors Turnover Ratios based on Weighted Mean Where weights(wi) are paid-up capital & Ri are Debt Turnover Ratios

WiRi

Company	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	∑(wiRi)	∑wi	wei R̄	W̄
JBF	183.328	214.969	294.07	398.297	451.651	539.98	762.408	791.995	657.96	639.205	4913.86	445.02	11.0419	44.502
Simtex	-	61.0064	66.6848	66.6848	92.2152	113.529	137.475	130.014	104.876	92.7129	865.198	185.37	4.66741	20.5967
Nilkamal	45.6781	46.5351	56.9048	71.6452	57.5904	55.7907	66.9317	102.879	97.128	110.547	711.63	98.33	7.23716	9.833
INEOS ABS	79.3309	83.3766	91.9957	93.9306	97.0968	117.501	110.817	130.87	124.01	134.036	1062.96	175.9	6.043	17.59
Essel Propack	242.736	162.864	271.302	300.046	238.345	243.356	246.175	192.305	146.264	170.381	2213.77	312.86	7.07593	31.286
Plastiblend	-	31.915	36.27	44.265	49.335	50.57	58.24	51.155	47.775	55.185	424.71	58.5	7.26	6.5
Gopala	11.5128	30.2339	31.0175	33.6948	56.227	52.9868	61.0632	71.1892	72.4014	73.9442	494.271	85.22	5.79994	8.522
Shaily	-	-	-	-	19.0314	18.8568	22.4652	24.7932	34.6236	30.0852	149.855	37.92	3.95188	6.32
Shree Ram	841.375	132.5	130.38	91.425	84.27	33.335	18.2776	40.9704	99.7264	108.619	1580.88	286.76	5.5129	28.676
Acrysil	5.14	7.4273	6.7848	8.425	5.0115	4.6003	5.4998	7.398	13.0746	13.2165	76.5778	26.49	2.89082	2.649
Jagdamba	-	-	-	-	5.9136	6.9608	8.2896	8.2896	6.9256	5.6384	42.0576	5.28	7.96167	0.88
Gujarat Craft	19.9351	17.5093	23.325	21.3657	15.3811	23.2317	19.1265	18.352	21.2413	22.4231	202.091	31.1	6.4981	3.11
Polylink	-	-	-	-	235.741	75.0684	117.876	111.517	-	-	540.203	59.54	9.07293	14.885
Promact	-	14.3895	11.1858	10.2627	10.1541	16.3986	-	49.6713	-	47.7834	159.845	40.17	3.97922	5.73857
Ashish	0.238	0.306	0.136	0.204	0.204	0.17	0.136	0.17	0.102	0.204	1.87	34	0.055	3.4
∑WjRj	1429.27	803.032	1020.06	1140.25	1418.37	1352.34	1634.78	1731.57	1406.11	1504			5.93652	
∑Wj	127.24	156.98	157	157.1	183.73	208.46	211.8	237.99	217.78	224.43				
wei R̄	11.2329	5.1155	6.49717	7.25809	7.71985	6.48727	7.71851	7.2758	6.45655	6.70142	7.24631			
W̄	14.1378	13.0817	13.0833	13.0917	13.8973	13.8973	15.1286	15.866	16.7523	16.0307				

where, weighted $\bar{R} = \sum (wiRi) / \sum (wi)$ $\bar{W} = \sum wi/n$ n = no. of years

The trend curve/line for the Debtors' Turnover ratios for the industry

Table No.-5.2.2

Year	Composite Debtors Turnover Ratios	Estimated ratio (from the line)
2000-01	11.23289925	7.993
2001-02	5.115503249	7.828
2002-03	6.497170701	7.663
2003-04	7.258085296	7.498
2004-05	7.719848147	7.333
2005-06	6.487267102	7.168
2006-07	7.718508026	7.003
2007-08	7.275804446	6.838
2008-09	6.456553403	6.673
2009-10	6.701422715	6.508

The chart showing the trend in Debtors Turnover Ratios for the industry is presented below.

Chart No.-5.2.3
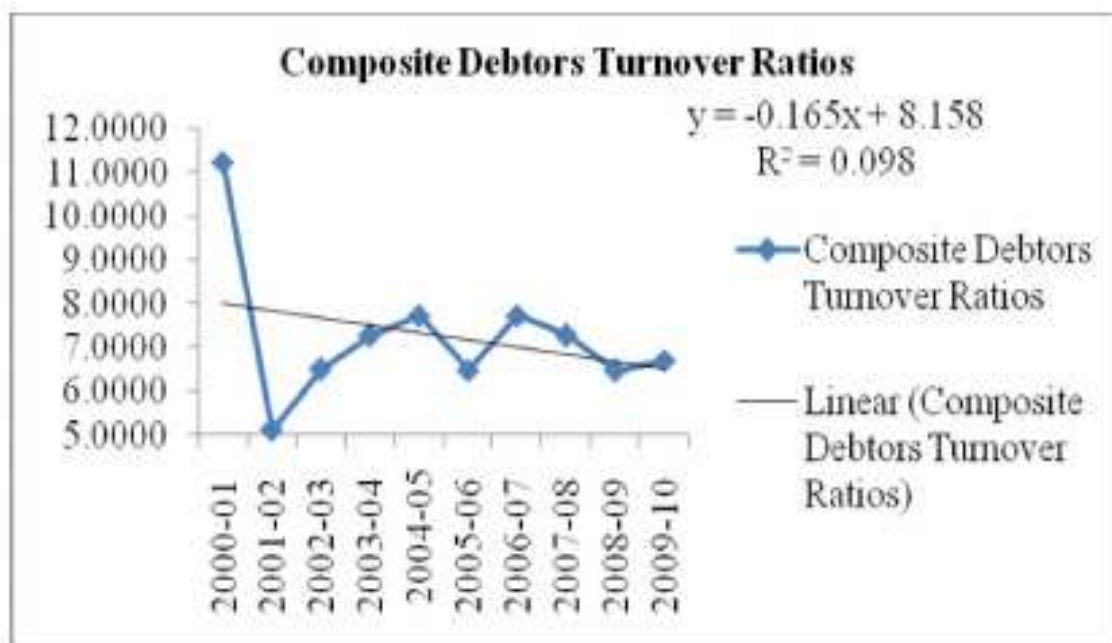
To test the following H0 related to goodness of fit, the Mann-Kendall test is applied to test the following hypothesis.

H0: There is no trend in the series of Composite Debtors Turnover Ratios of the industry.

H1: There is some trend in the series of Composite Debtors Turnover Ratios of the industry.

From the above trend detection test we found that there is no trend. From fitted linear regression line the R^2 value is 0.098, and p-value is 0.343, from which we can say that the model is not a good fit.

Conclusion: From the table no. – 5.2.2 and chart no. – 5.2.3 Debtors Turnover Ratio has steadily decline trend during the decade. In the beginning of the decade it was around 8 and it came down to 6.8 it shows that the recovery from the debtors, converting debtors into cash went slow. It also requires keeping more cash balance on-hand.

5.3. Fixed Assets Turnover Ratio:

Table No-5.3.1

Composite Fixed Assets Turnover Ratio based on Weighted Mean where weight (Wi) are Paid-up capital & Ri are ratios

WiRi

| Company	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	$\sum(wiRi)$	$\sum w$	wei $\bar{R}$	$\bar{W}$
JBF	28.228	29.159	38.465	50.252	68.864	83.300	135.950	146.462	123.858	529.040	1233.578	445.020	2.772	44.502
Simtex	-	19.802	21.840	23.587	35.112	39.855	42.989	41.626	32.436	30.814	288.061	185.370	1.554	20.597
Nilkamal	17.482	18.254	22.111	26.396	27.767	31.966	38.308	27.094	27.860	30.672	267.910	98.330	2.725	9.833
INEOS ABS	29.199	35.180	38.522	45.382	45.030	54.001	-	-	-	-	247.315	105.540	2.343	17.590
Essel Propack	43.680	34.320	49.640	60.255	65.459	60.134	56.689	59.508	22.864	28.188	480.736	312.860	1.537	31.286
Plastiblend	-	24.700	26.520	29.510	33.475	32.690	28.600	16.510	15.210	18.070	225.285	58.500	3.851	6.500
Gopala	7.938	25.010	28.797	33.891	25.636	20.108	22.513	23.693	21.820	29.313	238.719	85.270	2.800	8.527
Shaily	-	-	-	-	5.413	5.995	5.587	4.656	8.052	11.053	40.756	37.920	1.075	6.320
Shree Ram	50.880	7.420	7.550	5.830	3.975	4.720	0.120	9.210	20.008	29.502	139.216	286.760	0.485	28.676
Acrysil	6.913	9.458	9.689	7.607	5.371	5.885	8.712	4.401	5.632	4.544	68.213	26.490	2.575	2.649
Jagdamba	-	-	-	-	1.681	1.153	0.519	0.748	0.854	1.197	6.151	5.280	1.165	0.880
Gujarat Craft	11.005	10.730	14.928	18.631	17.323	30.913	24.414	8.335	7.557	7.371	151.206	31.100	4.862	3.110
Polylink	15.482	13.661	18.865	19.515	32.395	33.191	48.546	29.779	24.351	14.890	250.674	142.600	1.758	14.260
Promact	-	10.426	12.272	13.195	14.009	3.658	3.841	5.208	5.078	4.427	72.093	53.140	1.357	5.904
Ashish	1.768	1.938	2.074	2.754	3.162	10.506	13.940	8.262	8.364	9.044	61.812	34.000	1.818	3.400
$\sum WjRj$	212.576	240.056	291.272	336.805	384.672	418.056	430.729	385.492	323.942	748.125			2.178	
$\sum Wj$	140.250	169.990	170.010	170.110	183.730	208.460	200.720	220.400	222.210	222.400				
wei $\bar{R}$	1.516	1.412	1.713	1.980	2.094	2.005	2.146	1.749	1.458	3.364	1.944			
$\bar{W}$	14.025	13.076	13.078	13.085	12.249	13.897	14.337	15.743	15.872	15.886				

where, weighted $\bar{R} = \sum(wiRi)/\sum(wi)$ $\bar{W} = \sum wi/n$ n = no. of years

Table No.-5.3.2

Year	Composite Fixed Assets Turnover Ratios	Estimated ratio (from the line)
2000-01	1.5157	1.4650
2001-02	1.4122	1.5710
2002-03	1.7133	1.6770
2003-04	1.9799	1.7830
2004-05	2.0937	1.8890
2005-06	2.0055	1.9950
2006-07	2.1459	2.1010
2007-08	1.7491	2.2070
2008-09	1.4578	2.3130
2009-10	3.3639	2.4190

The chart showing trend in the Fixed Assets Turnover Ratios for the industry is presented bellow.

Chart No.-5.3.3
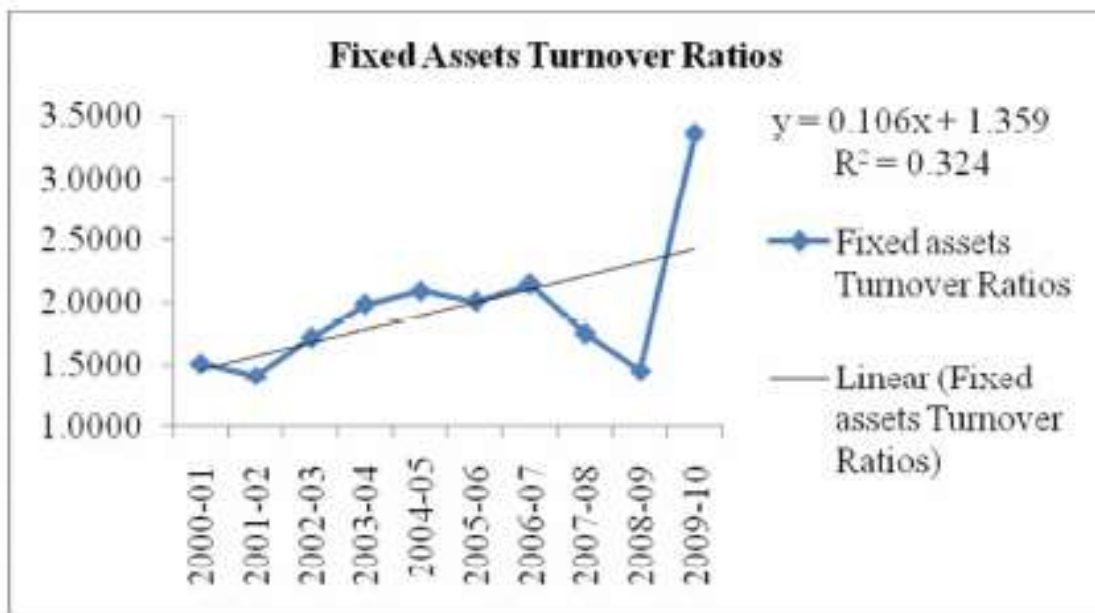
To test the following H0 related to goodness of fit, the Mann-Kendall test is applied to test the following hypothesis.

H0: There is no trend in the series of Composite Fixed Assets Turnover Ratios of the industry.

H1: There is some trend in the series of Composite Fixed Assets Turnover Ratios of the industry.

From the above trend detection test we found that there is an upward trend. From fitted linear regression line the R^2 value is 0.324, and p-value is 0.049, from which we can say that the model is a good fit.

Conclusion: From the table no-5.3.2 and chart no – 5.3.3Fixed Assets Turnover Ratio has linear rising trend. At the beginning of the decade it was around 1.45 and then at the end of the decade it reached to around 2.42. It is a good sign and shows the efficient use of Fixed Assets by the management.

5.4 Investment Turnover Ratio

Table No-5.4.1

Composite Investments Turnover Ratios based on weighted mean where weights (Wi) are paid up capital & Ri are ratios

WiRi

Company	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	$\sum(wiRi)$	$\sum w$	wei $\bar{R}$	$\bar{w}$
JBF	992.020	1915.795	1232.735	1481.205	2224.134	1029.000	1213.218	1621.007	689.619	529.040	12927.773	445.020	29.050	44.502
Sintex	-	104.978	93.330	115.898	130.838	218.017	199.719	319.495	320.576	359.229	1862.078	185.370	10.045	20.597
Nilkamal	91.785	81.501	68.903	72.245	69.760	82.272	73.531	77.702	109.013	103.007	829.718	98.330	8.438	9.833
INEOS ABS	148.877	202.813	184.343	125.241	178.714	198.239	180.298	234.827	197.712	213.191	1864.253	175.900	10.598	17.590
Essel Propack	456.144	290.472	487.032	597.899	312.260	346.399	305.057	336.690	280.940	4578.842	7991.736	312.860	25.544	31.286
Plastiblend	-	94.315	65.975	47.970	51.415	50.830	53.105	45.955	49.335	41.535	500.435	58.500	8.554	6.500
Gopala	37.261	136.542	112.120	103.435	136.470	158.865	134.257	149.431	146.015	195.274	1309.671	85.270	15.359	8.527
Shaily	-	-	-	-	62.099	52.031	50.576	61.110	73.639	77.738	377.194	37.920	9.947	6.320
Shree Ram	1191.970	172.780	213.325	189.210	218.095	394.415	456.940	215.650	197.547	224.861	3474.793	286.760	12.117	28.676
Acrysil	15.060	18.633	14.880	11.102	10.743	12.953	13.364	18.063	18.537	16.157	149.491	26.490	5.643	2.649
Jagdamba	-	-	-	-	9.601	11.352	9.064	8.677	10.894	8.782	58.370	5.280	11.055	0.880
Gujarat Craft	14.804	7.651	10.450	15.768	22.672	38.937	37.227	13.435	11.408	10.823	183.173	31.100	5.890	3.110
Polylink	125.937	156.771	185.523	198.403	217.527	222.879	221.018	184.259	344.942	231.254	2088.511	142.600	14.646	14.260
Promact	-	28.182	36.327	34.806	31.005	111.206	68.941	48.760	41.859	30.076	431.163	53.140	8.114	5.904
Ashish	4.760	5.814	6.018	8.432	9.996	17.714	17.340	14.484	16.456	27.642	128.656	34.000	3.784	3.400
$\sum W_j R_j$	3078.616	3216.245	2710.960	3001.613	3685.330	2945.109	3033.652	3349.545	2508.493	6647.452			11.919	
$\sum W_j$	140.250	169.990	170.010	170.110	183.730	208.460	218.310	237.990	239.800	239.940				
wei $\bar{R}$	21.951	18.920	15.946	17.645	20.058	14.128	13.896	14.074	10.461	27.705	17.478			
$\bar{w}$	14.025	13.076	13.078	13.085	12.249	13.897	14.554	15.866	15.987	15.996				

where, weighted $\bar{R} = \sum(wiRi)/\sum(wi)$ $\quad\quad$ $\bar{w} = \sum wi/n$ $\quad\quad$ n = no. of years

Table No.-5.4.2

Year	Composite Investments Turnover Ratios	Estimated ratio (from the curve)
2000-01	21.95092	22.734
2001-02	18.9202	19.64
2002-03	15.94588	17.268
2003-04	17.64513	15.618
2004-05	20.0584	14.69
2005-06	14.12793	14.484
2006-07	13.89608	15
2007-08	14.07431	16.238
2008-09	10.46077	18.198
2009-10	27.70464	20.88

The chart showing trend in the Investment Turnover Ratios for the industry is presented below.

Chart No.-5.4.3
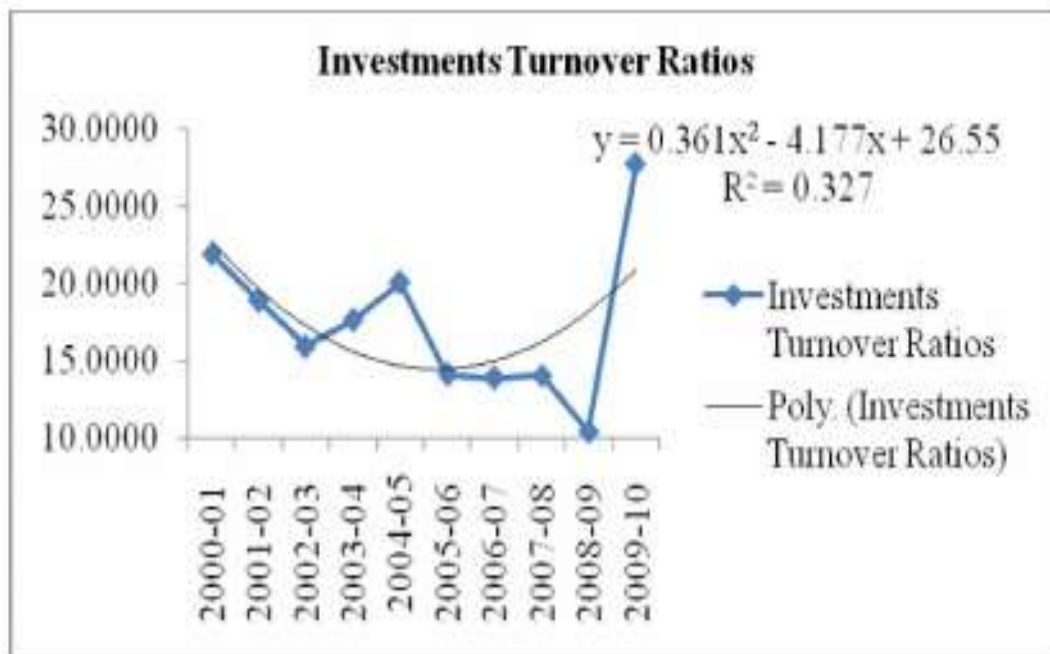
To test the following H0 related to goodness of fit, the Mann-Kendall test is applied to test the following hypothesis.

H0: There is no trend in the series of Composite Ratios of Investment Turnover of the industry.

H1: There is some trend in the series of Composite Ratios of Investment Turnover of the industry.

From the above trend detection test we found that there is no trend. From fitted linear regression line the R^2 value is 0.015, and p-value is 0.071, from which we can say that the model is not a good fit. Therefore we try to fit 2nd degree polynomial equation on the series and get R^2 value is 0.327, and p-value is 0.249, from which we conclude that the 2nd degree polynomial equation is also not a good fit.

Conclusion: From the table no 5.4.2 and chart no-5.4.3 the trend of the investment turnover ratio during the decade was quadratic in nature during the first half of the decade it declined steadily from about 23 to around 14.5 during 2006-07 and than its steadily rose upto the level around 21. It shows the capacity to raise the sales with existing investments. This ratio improved in the last 4 years, which indicates a good sign of the industry, going back to higher than the Investment Turnover ratio at the initial year level.

Findings:

- There is no trend in the inventory turnover ratio of plastic industry of Gujarat.

- Inventory turnover ratio was positive during the decade and was in the range of 15.5 to 18.5.

- There was declining trend in the debtors turnover ratio of the plastic industry of Gujarat.

- Debtor's turnover was declining at rate of 0.165 per year.

- There was linear rising trend in the fixed assets turnover ratio. It was 1.45 in the year 2001 and 2.42 in 2010.

- The investment turnover ratio declined steadily during first half of the decade (i.e. from 23 to 14.5 during 2001 to 2007) but steadily improved in last four year.(i.e.rised up to 21 in 2010.)

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