PORTER’S FIVE FORCES ANALYSIS OF THE INDIAN PLASTIC INDUSTRY

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ABSTRACT

The Indian Plastic Industry has undergone dramatic changes since its inception be in the form of government initiatives or be it the no of players entering or their fluctuations in their operating scale. In the coming days, plastic will definitely have a bigger role to play particularly because of its wide utilization areas and diverse applicability. Although some controversies have crept in due to inadequate knowledge of the production techniques and their extent of adverse effects; still the industry believes that modern R & D efforts and government initiatives encouraging plastic usage will definitely help in overcoming these discrepancies. Till now, from a strategic view point industry analysis has not been performed on the Indian Plastic Industry while similar work has been widely done in other country context. This paper attempts to fill this gap. It holds certain insights for academicians which suggests to delve deeper for a firm level analysis as the sector is maximally ruled by SME’s and getting data is a significant problem. For the general reader it can imbibe a holistic idea of the Indian Plastic Industry along with its current strengths and limitations.

KEYWORDS: Indian Plastic Industry, Value Net Analysis, Herfindahl Index, Concentration Ratio.

1. INTRODUCTION

Since independence, plastic industry in India have been playing a predominant role in shaping our lives. As it an indispensable item in our day to day activity, so its importance cannot be undermined. Since last decade with the advent of new and improved technologies, the industry has gained greater importance with the production of better and improved quality of polymers (plastics) which has supported the radical change in human life and its day to day activities.

The name “plastic” has been coined from “plastikos”- a Greek word meaning capable of being shaped or molded. The material is formed by repeating units of monomers forming long chains consisting of large molecules and characterized by light weight, high corrosion resistance and low melting points. Presently, there exist about 50 different types of plastics. Broadly plastics can be classified into two types namely (a) Thermosetting (can be softened or molded into a particular shape by applying heat and pressure only once) and (b) Thermoplastic,(can be softened repeatedly by application of heat and pressure).

Apart from these, plastics have been also divided into seven different types by the plastic industry. These seven types of plastics are :-
POLYETHYLENE TEREPHTHALATE (PETE) :- PETE is one the most recycled plastic. It finds usage in various bottles like that of soda and cooking oil, etc.

HIGH DENSITY POLYETHYLENE (HDPE) :- HDPE is generally used in detergent bottles and in milk jugs.

POLYVINYL CHLORIDE (PVC) :- PVC is commonly used in plastic pipes, furniture, water bottles, liquid detergent jars etc.

LOW DENSITY POLYETHYLENE (LDPE) :- LDPE finds its usage in dry cleaning bags, food storage containers etc.

POLYPROPYLENE (PP) :- PP is commonly used in bottle caps and drinking straws.

POLYSTYRENE (PS) :- PS is used in cups, plastic tableware etc.

OTHER :- This category of plastics include those plastics which are different from the six aforesaid types of plastic. These plastics are usually used in food containers and in Tupperware.

Thus it is evident from the above classification and wide usage domain the vast role played by plastic in shaping the day to day human life. So here an honest effort has been made to gain some insights of this growing industry in India with the help of Michael Porter’s Five Forces Model & Value Net Analysis.

2. OVERVIEW OF THE INDIAN PLASTIC INDUSTRY

The Plastics Industry in India has made significant development since its inception in 1957 by producing Polystyrene. The chronology polymer manufacture in India is as under:-

- 1957~ Polystyrene
- 1959~ Low Density Poly ethylene (LDPE)
- 1961~ Poly Vinyl Chloride(PVC)
- 1968~ High Density Poly Ethylene(HDPE)
- 1978~ Polypropylene

Though exact figures are not available after 1978 but latter and subsequent years followed tremendous growth in plastic both in variety and features. Indian entrepreneurs have been long motivated by the potential market to acquire technical expertise & knowledge, achieve high quality standards and build capacities in various sectors of the growing plastic industry. Significant developments in the petrochemical industry and plastic machinery industry have led the plastic processing industries to develop capabilities to cater both domestic as well as overseas market.
With liberalization in 1992, Indian Government has supported this industry through conducive measures spread over a couple of years. All these economic measures have been taken irrespective of political and power changes. With Indian GDP supposed to grow at a rate greater than 7% in the next 10 years, growth in plastics can be around 14 %, based on historical performance.\(^1\)

Also nowadays, steps are taken by the Indian Government that shows its positive & supportive attitude to new investments in India. For e.g.-the Petrochemical Department of the Government of India is in the process of setting up a development council to promote the development of downstream sectors in India.

Quite a no of foreign players have set up 100% owned companies in India in the plastics processing and machinery industry sectors. Foreign equity participation in the petrochemical industry has been increased to a 51% stake (a majority stake). However, the polymer manufacturers and other downstream industries are free to set up projects 100% on their own equity. Some examples of the international companies that have set up projects in India on their own are:

- **POLYMER MANUFACTURING**: BASF Styrenics, Bayer ABS, LG Polymers, Compounding, Clariant, DSM, Dupont & GE Plastics.

- **CONVERTING INDUSTRY**: 3M, Baxter, Delphi (Automotive Parts), Huhtamaki (Plastic Film Converter), Moser Baer, Visteon (Automotive Parts) & Terumo Penpol.

- **MACHINERY**: Cincinnati Mailcron, Nissei & Side.\(^2\)

The above is not a comprehensive list. Some initially started as joint ventures but later, when the Government of India granted permission, they acquired remaining equity stake from the Indian partners. Additionally, quite a many joint ventures have been formed in India. Some notable joint ventures are: MachinoBasell (compounding), Mamta Brampton (Machinery).

The Indian plastics industry, with more than 4 million tons consumption in 2003 is well spread all over India. While it is estimated to be fragmented across more than 20,000 processors, the large processors are less than 100. These 100 have about 35% share of the plastics processing industry. The major sectors in which large processors are present are:

- PVC pipes - the largest producer is Finolex Industries with capacity of 60,000 MT/year.

- BOPP film - the largest producer is Cosmo Films with the capacity reaching almost 60,000 MT in 2004.

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\(^1\) [www.plastemart.com](http://www.plastemart.com)
\(^2\) [www.plastemart.com](http://www.plastemart.com)
\(^3\) [www.indianplasticportal.com](http://www.indianplasticportal.com)
- BOPET film - the largest producer is Polyplex with the capacity of 80,000 MT out of which 40,000 MT is constructed in Thailand.

- Wire & Cable - the largest producer is Finolex Cable with estimated consumption of PVC at 35000 MT/Year and PE at about 5,000 MT/year.

- PE/PP raffia (film fiber) generally has larger processors with average capacity of about 10,000 MT/year. Some notable processors are: Jai Corporation & Big Bag.

- Moser Baer is the largest processor of CD, DVD etc and consumes about 25,000 MT/year of polymers

- Cast PP film sector has about 7 processors with the total capacity of about 35,000 MT/year

- PP spun fiber has about 10 processors with the total capacity of about 50,000 MT/year

- Calendered PVC film segment is spread among 20 processors with the total capacity of about 150,000 MT/year

- Plastiblends India is the largest master batch manufacturer with the capacity of about 20,000 MT/year

Plastic has a derived demand. Our per capita consumption of plastic (5 kg, 2007) is lowest in the world. Greater utilization of plastics can drive growth of the food processing industry, improve agricultural productivity and reduce poor harvest losses. In India domestic polymer demand is 12.75 MMT. In a typical developed country, infrastructure sector contributes 25% in polymer demand whereas in India, the consumption in this sector is 20%. The agricultural sector accounts for 7% in polymer demand in a typical developed country, but in India agricultural consumption accounts for 1% of total consumption.

As the Planning Commission has targeted GDP to grow at 9 percent, other things remaining constant, domestic polymer demand is expected to reach 9.5 MMT by 2012. The department of petrochemicals of the Government of India has projected a level of 12.75 MMT by 2012. This extra demand will be driven by Packaging, Plasticulture and Plastics in Infrastructure. Currently, the per capital consumption figures in the year 2007 was 5 Kg for India, 17 Kg form Asia, 18 Kg for China and 25 kg globally. India’s projected per capital plastic consumption is expected to be 7.4 kg in 2010, for Asia 21.6 kg and for world it is 28.9 Kg and China it will be 24.2 Kg. Per capita consumption of plastic products is much higher in the developed countries as compared to the developing countries.

The past growth rate of the plastics industry in the last few decades have been around 12-14 percent, a rate twice the GDP growth. Improving living standards of people was the dominant factor in achieving this rates.

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The Indian plastics industry is very positive regarding its future potential hoping that the plastics industry will grow between 10% to 12%, if not higher, in this decade. Consumption level, which is expected to reach 8 million tons by 2010. The PlastIndia Foundation expects business transactions worth $150 million. The polymer production has increased by almost 9% in the 2005-06 over 1995-96 period from 1.8 MMT in 1995 to 4.5 MMT in 2005. There is a wide variety in the polymer consumption pattern in India when compared with the world. But the main driver for polymer consumption in India has been attributed to packaging. Crisil report suggests HDPE to achieve 74 percent growth by 2012 (with respect to 2005 figures). The corresponding figures for LDPE, LLDPE and PP are respectively 2%, 75% and 141%.

The current statistics for the industry is as: (1) Major raw material producers-15 (2) Processing units-25,000 units (3) Turnover (Processing industry)-Rs 85,000 crores (4) Capital Asset (Polymer Industry)-Rs 55,000 crores (5) Raw Material Produced-5.3 MMT (6) Raw Material Consumed-5.1 MMT (7) Employed (Direct/Indirect)- 3.3 million (8) Export Value Approx-US $ 1.90 billion (9) Revenue to Govt-Rs 7300 crores.

Targets for 2011-2012: (a) Demand Potential-12.5 MMT (b) Additional Employment-4 million (c) Investment Potential-Rs 84,000 crores.

Industry experts vision for 2015: (a) Consumption of Polymers @ 15% CARG- 18.9 MT (b) Turnover-Rs 1,33,245 crores (c) Additional Employment Generation-7 million (d) Requirement of Additional Processing Machines-68113 (e) Additional Capital Investment In Machines (2004-2015)-Rs 45,000 crores.

Proper usage of plastics would help improve the present environmental condition as it provides for a substitute for wood and paper and hence could help maintain the forest reserves. Currently, 75 percent of the plastic processing is done in SSI (small scale Industries). Over 3.3 Million employed in about 22,000 units. Average unit output is around 200-225 TPA (1/4th of China & 1/8th of USA).

India has an ambitious growth of 4.1% in agriculture till 2012. Rapid adoption of plastic applications alone can provide 50% of the intended targets in agriculture. Use of Plastic in Post Harvest Management can boost agriculture GDP by Rs 6000 crores. Plastic is clearly superior for piping systems. Chemical degradation is not observed in PVC Pipes. These pipes offer a projected life span of over 100 years. Also these are lighter and cheaper to install.

A wide variety of products made of plastic are being exported:
• RAW MATERIALS

PVC, Polypropylene, Polyethylene, Polystyrene, ABS, Polyester Chips, Urea / Phenol Formaldehyde, Masterbatches, Additives, etc

• PACKAGING

PP / HDPE Woven Sacks / Bags / Fabrics, Poly-lined jute goods, Box strapping, BOPP Tapes, a range of plastic sheeting / films (of PVC, PP, HDPE, Nylon, FRP, PTFE, Acrylic, etc.), pouches, crates, bottles, containers, barrels, cans, carboys, shopping / carrier / garbage bags.

• FILMS

Polyester Film, BOPP Film, Mesh, Metallised / Multilayer Films, Photo Films.

• CONSUMER GOODS

Toothbrushes, cleaning brushes, hair brushes, nail / cosmetic brushes, combs, moulded furniture (chairs, tables, etc.) houseware, kitchenware, insulated moulded houseware, microwave re-heatable containers, mats and mattresses, water bottles, gifts and novelties, a range of stationery items like files, folders, mathematical instruments, etc.

• WRITING INSTRUMENTS

Pens, ball pens, markers, sign pens, refills, etc.

• TRAVELWARE

Moulded luggage, soft luggage, a range of bags like school bags / ladies handbags, wallets, etc.

• LEATHERCLOTH/CoverINGS

Vinyl floor coverings and linoleums

• FOAM BOARDS DRIP IRRIGATION SYSTEMS/COMPONENTS PIPES AND PIPE FITTINGS

Made of PVC, HDPE, PP, FRP, Nylon

• WATER STORAGE TANKS TOYS AND GAMES ENGG. PLASTICS

Auto components, parts for various machinery equipment in telecommunications, railways, electronics, etc.
• **ELECTRICAL ACCESSORIES FRP/GRP PRODUCTS**
  Safety helmets / equipment, pipes, storage tanks, etc.

• **SANITARY FITTINGS**
  Cisterns, toilet seats, bathroom fittings, etc.

• **CONSTRUCTION**
  PVC profiles, doors, windows, etc.

• **TARPAULINS LAMINATES FISHNETS/FISHING LINES CORDAGE / ROPES / TWINS EYE WEAR**
  Lenses, spectacle frames, goggles, etc.

• **LABORATORY WARE SURGICAL / MEDICAL**
  Disposable syringes, blood / urine bags, I.V. sets, etc.

Thus as we can see there is huge scope for plastic industry in India to grow. This above discussed figures gives the impetus to explore further this industry in India assessing its strengths & weaknesses, major players and their competitiveness, major buyers and suppliers and their interaction, key impediments for its growth etc.

3. **MOTIVATION FOR STUDY**

India’s economy is the eleventh largest economy in the world by nominal GDP and the fourth largest by purchasing power parity (PPP). With a large pool of human and natural resources, and a growing large pool of skilled professionals, India is likely to be among the leading economies of the world by 2020 as per economists’ predictions. This gives the motive to analyze this plastic industry in India as it has huge impact on every sectors of the economy as seen from the background study. India is the world’s second largest populated (1,186,920,000) country after China followed by USA accounting for about 17.3 percent of total world’s population. This ever increasing population nourishes the ground of the development of the plastic industry.

Growth in agriculture and food processing industry requires growth in plastics as well as plastics forms an important packaging material in this industries. It is clear that this is an industry which is having short term as well as long term effects on Indian economy. At the same time its an indispensable item in every daily human activity. This factors motivated us to go for analyzing this industry using Michael Porter’s 5 Forces Model.
4. OBJECTIVE

This paper tries to

- identify the key suppliers
  - their bargaining powers, factors affecting this power
- identify the key buyers
  - their negotiating & bargaining powers, factors affecting this power
- identify the new players in plastic industry and probable threat from them.
- identify the substitutes of plastics and possible threats from them
- identify rivalry/competition nature between existing firms in this industry.
- identify strengths, weaknesses, opportunities and threats for the above industry.

5. METHODOLOGY

DATA SOURCES: All relevant data used in this paper have been collected from published and online secondary sources.

TOOLS: In this paper Porter’s 5 forces model is being used to analyze the Indian plastic industry and identify the various parameters in the industry with conformity to those in the model.

Porter's five forces is a framework for the industry analysis and business strategy development developed by Michael E. Porter of Harvard Business School in 1979.

He has identified five forces that are widely used to assess the structure of any industry. Porter’s five forces are the:

- Bargaining power of suppliers
- Bargaining power of buyers
- Internal Rivalry
- Entry
- Threat of substitutes

With this we have also incorporated the Value Net suggested by Brandenberger and Nalebuff which consists of the suppliers, customers, competitors and complementors and is similar to five
forces. But whereas Five forces basically analyses threats to profits, a Value Net analysis assesses opportunities.

6. INDUSTRY ANALYSIS WITH PORTER’S 5 FORCES MODEL

MARKET STRUCTURE: The Competition in this Industry is severe since its inception. The market is essentially oligopoly in nature. Recent years have marked significant growth of plastics material globally through the innovation of newer application areas for plastics such as increasing plastics applications in automotive field, rail, transport, defence & aerospace, medical and healthcare, electrical & electronics, telecommunication, building & infrastructure, furniture, etc. Main segment remains “Packaging” accounting for over 35% of the global consumption. Amongst the individual Plastics Materials, Polyolefin accounted for 53% of the total consumption, (PE with 33.5%, PP with 19.5%) followed by PVC – 16.5%, PS-8.5%, PET & PU - 5.5%, Styrene copolymers (ABS, SAN, etc) – 3.5% other engineering & high performance & specialty plastics, blends, alloys, thermosetting plastics – 13%.

The SSI sector accounted for more than 70% of the industry turnover. About 95% of the firms in the industry are partnership, proprietorship or private limited companies enjoying significant tax advantages thereby providing significant level of competition to the big companies, which combined together are making losses. The big companies thus need to build up significant brand image to survive against the competition from the SSI sector. The key players include Nilkamal Plastics Limited and Supreme Industries Limited.

Another classification calls for it to be divided into four sectors:(a)Polymer Manufacturers (b)Plastic Processors (c)Equipment Manufacturers (d) Recycling Industry.

Depending on the capital strength the above four sectors are further described. Polymer Manufacturers is the organized sector with high capital strength and constituting 15 key players. The Equipment Manufacturers constitute the medium capital intensive group and is consisted of around 200 players. This sector is also largely organized. Plastic processors and the recycling industry falls in the unorganized and low capital intensive groups with the former consisting of about 22000 players and the latter with 7360 players. Thus its evident that the industry is being largely dominated by firms of different sizes and each of them having different scale of operations. So its necessary an oligopoly market. Also the demand of plastic is largely a derived demand thereby necessitating to have a demand pull from the end users. Thus the major buyers in this industry are the agriculture sector, the packaging sector, the automobile, the electronics and the packaging industries connoting the vast applicability of plastic and its wide usage in various spheres.

Top 5 key players in the polymer manufacturing is as follows:

1. RIL(38%)
2. IPCL(24%)
3. Haldia Petrochemicals(19%)
4. Gail(6%)
5. Finolex(5%)

The figures in the braces indicates the market share of the concerned key players. Remaining 8% is attributable to other players. ONGC expecting to set up production facilities for HDPE, LLDPE, PP and SBR at Dahej in Gujarat by 2010. Therefore, the competition in the sector is going to increase with the entry of ONGC and IOC. Nilkamal’s plastic business has achieved a volume growth of 27% and value growth of 21% in the financial year 2009-10. During 2009-10 it has achieved total turnover of Rs. 102,885 lacs as compared to Rs. 90,496 lacs in the previous year. Finolex and Supreme Industries have also shown comparable growth figures.

Due to the presence of a large no of small scale industries governing the sector and attributing to the presence of the unorganized group. So its difficult and a tedious job to list all the vast 22000 players constituting the plastic processors group. But from this its evident the impact of policies and regulations regarding the small scale industries by the Indian Govt is playing a key role in influencing the demand and surreptitious consumption of plastic in India. Thereby the nature of competition in the Indian plastic industry will depend largely on the trends prevailing in the above five end user industries. Thus it becomes customary to have a glimpse of the end user industries and the allied trends that are influencing and governing the existent fierce competition in the plastic industry. ONGC expecting to set up production facilities for HDPE, LLDPE, PP and SBR at Dahej in Gujarat by 2010. Therefore, the competition in the sector is going to increase with the entry of ONGC and IOC.

**CONCENTRATION RATIO:** Markets are generally being attributed as concentrated or unconcentrated. This comes from an analysis of the market structure. In any industry, the no of firms and their distribution determines market structure. One common measure of market structure is the n-firm concentration ratio which gives the combined market share of the n largest firms in the market. In practice, usually 4-firm concentration ratio and 8-firm concentration ratio are commonly used depending on the largest 4 firms or 8 firms respectively as applicable. Here the first 4 in the polymer manufacturing i.e, RIL, IPCL, Haldia Petrochemicals and Gail are taken.

The 4 firm concentration ratio in the polymer manufacturing comes to 38%+24%+19%+6%=87%. This figure indicates that this polymer manufacturing market is highly concentrated oligopoly market. By convention, concentration ratios falling between 80 to 100 percent are considered to be highly concentrated and market is oligopoly with a few big players having significant market control.

**HERFINDAHL INDEX (HHI):** Another measure of market structure is Herfindahl index (HHI). It equals the sum of the squared market shares of all the firms in the market. Here in
polymer manufacturing there are 5 key players and combined market share of these five is 92%
.Remaining 8% is attributed to other players.

Therefore Herfindahl index for this polymer manufacturing is: $0.38^2 + 0.24^2 + 0.19^2 + 0.06^2 + 0.08^2 = 0.2481$. Since anything between 0.2 to 0.6 for Herfindahl index is considered to be indicative of oligopoly character, hence here 0.2481 suggests the polymer manufacturing market is oligopolistic.

The following table gives an idea of the companies present in the plastic industry product wise:

<table>
<thead>
<tr>
<th>Products</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brushes, Brooms, Bristles &amp; Allied Products</td>
<td>751</td>
</tr>
<tr>
<td>Buckets, Mugs, Storage Bins &amp; Similar Products</td>
<td>1191</td>
</tr>
<tr>
<td>Jumbo Bags, Gunny Bags, Bulk Bags and Sacks</td>
<td>959</td>
</tr>
<tr>
<td>Miscellaneous Plastic &amp; Rubber Products</td>
<td>625</td>
</tr>
<tr>
<td>Packaging Bags, Laminated Bags and Zip Bags</td>
<td>1687</td>
</tr>
<tr>
<td>Pet-Use Products, Feeds, Pet Furniture &amp; Allied Products</td>
<td>441</td>
</tr>
<tr>
<td>Pipes: Plastic, PVC, Fiber Reinforced Plastic, ABS</td>
<td>1431</td>
</tr>
<tr>
<td>Plastic &amp; Moulded Furniture</td>
<td>616</td>
</tr>
<tr>
<td>Plastic Processing Machines &amp; Equipment</td>
<td>1033</td>
</tr>
<tr>
<td>Plastic Raw Material</td>
<td>1529</td>
</tr>
<tr>
<td>Plastic, PVC &amp; PU Products</td>
<td>5802</td>
</tr>
<tr>
<td>Resins &amp; Allied Products</td>
<td>907</td>
</tr>
<tr>
<td>Tent, Tarpaulins, Awning, Canopies Etc.</td>
<td>1088</td>
</tr>
</tbody>
</table>

(Detailed list of key players being provided in the annexure with the leaders names in italics)

- In the brushes, brooms sector among 751 companies only 12 are key players and among them two viz. P. S. Daima and Sons & Liftboy Industries, Sahibabad are leading suppliers.

- In the buckets & mug segment among 1191 companies 34 are key players and 11 are leading suppliers.

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The bags segment sees among 959 players about 13 key players and among them 6 leading suppliers.

In the plastic & rubber segments, out of 625 players, 18 are key ones with 6 leading ones.

Among the plastic bags and laminated bags segment, out of a total 1687 players, 17 are key players with 6 as the leading suppliers.

In the pet use products segment, out of 441 players only 6 are key ones with 4 leading suppliers.

In Plastic pipes and PVC sector of 1431 players, only 4 are leading ones among 14 key ones.

The Plastic and Moulded furniture sector consists of 616 players but only 4 are key players with two leading ones.

The processing machines sector operated by 1033 players with 17 key players and 5 among them to be the leaders.

The plastic raw material sector is ruled by 1529 players with 9 as key ones and only one Triveni Chemicals as the leader.

The PVC & PU products sector has 5802 players with 56 key players and among them 12 are leading ones.

The Resins and Allied products is operated by 907 players with 10 key players and one leader.

The Tent, Tarpaulins sector has 1088 players with 11 key players and one leader.

7. VALUE NET ANALYSIS

Many companies are specializing in two or more products while others are concentrating on one only. This is exemplified by the list provided in the annexure in which some companies are appearing in two or more sectors. Also this exhibits the fact that in this 13 sectors the percentage of key players is very low compared to the total no players operating and the same applies for the leaders as well. Therefore, in every sector the key players have to remain aware of their highly competitive environment as the huge no small players can quickly respond to the changing demand conditions in the market due to low investment and cost of production relative to their bigger counterparts which are the key players. The list also exhibits the complementary nature of the industries supporting each other. Every firm in the above mentioned list many a times acts as suppliers to other firms in the same list for manufacturing their product. Thus in such an industry, with diversified products, production and consumption pattern as well, it is the combined effect of the business environment and each firm’s performance that influences a firm’s bottom line. Also the above information entailing the presence of about 10-12 key
suppliers with about one to three (approx) as leaders in every category and there too quite a few firms are present in many of the product categories indicating the commonality in production across the concerned sectors gives rise to the importance of positioning and differentiation. These firms are in constant effort of devising new and newer ways of differentiating their products and positioning them. So positioning is an important attribute that shapes this industry. So opportunities are many in this industry for further product innovation. Whenever a company adopts a new technology to produce a new and innovative product, it really need regulations and patent support to protect the same from imitating by its competitors. The vast no. of firms in the SSI sector have led the govt. to set favorable regulations supporting the sector in the allied industry. It is evident that therefore these huge chunk of players are also coordinating and cooperating among themselves leading to each other’s growth by improving product quality, offering them at competitive prices in the market and setting regulations conducive to their growth. Also, the big firms and their allied suppliers are continuously working to improve efficiency along the entire chain so as to retain their market position and brand image in such highly competitive market environment.

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Segment(2)</th>
<th>Total (3)</th>
<th>Star players(No)(4)</th>
<th>Star players (%)(5)</th>
<th>Leaders (No.)(6)</th>
<th>Leaders (%) (7)</th>
<th>Leaders(as % of Star)(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brushes, Brooms, Bristles &amp; Allied Products</td>
<td>751</td>
<td>12</td>
<td>1.6</td>
<td>2</td>
<td>0.266</td>
<td>16.67</td>
</tr>
<tr>
<td>2</td>
<td>Buckets, Mugs, Storage Bins &amp; Similar Products</td>
<td>1191</td>
<td>34</td>
<td>2.85</td>
<td>11</td>
<td>0.923</td>
<td>32.35</td>
</tr>
<tr>
<td>3</td>
<td>Jumbo Bags, Gunny Bags, Bulk Bags and Sacks</td>
<td>959</td>
<td>13</td>
<td>1.36</td>
<td>6</td>
<td>0.625</td>
<td>46.15</td>
</tr>
<tr>
<td>4</td>
<td>Miscellaneous Plastic &amp; Rubber Products</td>
<td>625</td>
<td>18</td>
<td>2.88</td>
<td>6</td>
<td>0.96</td>
<td>33.34</td>
</tr>
<tr>
<td>5</td>
<td>Packaging Bags, Laminated Bags and Zip Bags</td>
<td>1687</td>
<td>17</td>
<td>1.007</td>
<td>6</td>
<td>0.355</td>
<td>35.29</td>
</tr>
<tr>
<td>6</td>
<td>Pet-Use Products</td>
<td>441</td>
<td>6</td>
<td>1.36</td>
<td>4</td>
<td>0.907</td>
<td>66.67</td>
</tr>
<tr>
<td>7</td>
<td>Pipes: Plastic, PVC, Fiber</td>
<td>1431</td>
<td>14</td>
<td>0.978</td>
<td>4</td>
<td>0.279</td>
<td>28.57</td>
</tr>
</tbody>
</table>
In the above table, column (5) shows the percentage of star players across each segment and similarly column (7) shows the percentage of the leaders across their respective segments. Finally column (8) publishes the proportion (in percentage) of the important (star) players that have become leaders in the respective segments.

The star players are actually the most important players across the vast no. of players present across each product segment and these players are determined “star” on the basis of the rating as “star” by several related and informative websites on plastic and polymer industry. The same theory applies for the leaders as well. Obviously, a leader is a subset of a star as it has become a star player first and then gradually through product improvement and brand building it has converted itself into a leader in the allied market.

The following diagram gives a visual representation of the percentage of Star players.
The below diagram gives again a visual comparison of the percentage of leaders in the various categories:
The above diagram clearly depicts the percentage of the star suppliers that became leaders in their respective segments as a result of economies of scale and product specialization and various other similar factors like able to build and project itself as a strong brand, customer loyalty and flexibility in adjusting output according to the market demand.

Thus its evident that in this kind of market where demand of a particular material is very high due to its wide applicability in manufacturing a wide variety of products suiting and catering to the tastes and preferences of a variety of people the competition will be high always as the total no. of players present in each category is huge. The opportunities present in product innovation in each segment will attract many players having sufficient capital reserves to innovate and launch distinct products in the market. And it is this innovativeness in product invention coupled with aggressive marketing with govt. support will determine the future leaders across every product segment.

**BARGAINING POWER OF SUPPLIERS**

Generally supplier power is investigated through concentration of supplier, volume importance to supplier, differentiation of inputs and switching costs of firms in the industry. A few factors which increases the supplier powers are (a) presence of few suppliers (b) presence of large no. of purchasers (c) high costs of switching suppliers. Supplier power is highly reinforced when a supplier has control over prices.

There are a large no of small firms with a variety of product differentiation. Due to the wide applicability nature of plastic in a variety of spheres, there is a great variety in demand also. To cater to this diverse demands, there are some firms focusing on producing a single product with features making it suitable for only a specific usage. Also there are some firms producing a...
product with wide application areas. Last but not the least, there are also firms that are producing
two or more related products that serves as raw material to produce a finished product in another
firm.

The Indian plastic industry is essentially an oligopolistic market. The polymer manufacturers and
the equipment manufacturers are the suppliers for the plastic processors. Since there are 15 key
players (Gail, RIL, IPCL etc) in the polymer manufacturing sector supplying essential raw
materials to the large no of plastic processors, bargaining power of these polymer manufacturers is
high. But there are huge no of equipment manufacturers which are also small firms and since
there are large no of plastic processors, competition is fierce as firms are small in size they
operate in small volume, hence no of orders are equally important for maintaining the bottom
lines.

As regards to switching costs, the figures are high for switching polymer manufacturers because
of their small no but low in case of switching equipment manufacturers due to the presence of
small manufacturers in large nos. Thus its clear already by now the fact that in the plastic
industry, the polymer manufacturers because of their huge nos. have low control in pricing their
products.

**BARGAINING POWER OF BUYERS**

Due to the wide applicability of plastic in every industry, it is evident that buyers in this industry
are huge and they range from small to big sized firms. The end user industries for plastic are
Agriculture, Infrastructure, Electronics, Packaging and Automobiles. Each of these is again a
vast sector encompassing several areas requiring plastic usage. In this case, buyers power is
largely determined by firm size and its scale of operation. Because if a firm is producing a
standardized product, in that case its definitely operating ins volume so that per unit cost is low.
This type of firms will definitely have high bargaining power due to the presence of large no of
plastic processors. Also such a firm will not make tie up with only one plastic processor, as in
times of exigency if the plastic processor fails, then the entire production of the firm will come
to a complete halt and the firm may have to incur huge losses and earn a bad reputation. In that
sense, it can be said that Agriculture, Infrastructure and Packaging have low to medium
bargaining power whereas automobiles and electronics have high bargaining power.

**INTERNAL RIVALRY**

Since a large chunk of the plastic processors are lying in the small and medium scale range of
industries, hence internal rivalry is very high. Though its also a fact that there are wide variety of
plastic that are produced, each one with a different feature and hence different application
oriented, still the variety is not sufficient to wipe out the competition and enable each producer to
cater to single variety having a single consumer.

Though the industry is not stagnant but due to the presence of large no of small players it
becomes mandatory for bigger ones to steal business from their smaller counter parts in order
that the bigger ones wants to expand their output. Also due to the divergent nature in the scale of
operation, firms have different cost structures.
Big players like RIL, HPL, Finolex etc are under constant pressure to boost sales with an objective of full utilization of their production capacity. Also due to the diverse nature of the industry itself, it often becomes difficult to match prices posed by small players since they generally specializes on a particular variety, so they can adjust their prices quickly and often lead to price wars in the industry and the big ones takes time due to their focus on relatively greater variety.

**ENTRY**

As the no of entrants grew in an industry the net market demand gets distributed among them resulting in the eroding away of profits of the existing players in the concerned market. Due to the fragmented nature of the plastic industry, sometimes new entrant faces difficulty in case that it does not achieve a substantial market share to reach the minimum efficient scale, it usually stands at a cost disadvantage.

Due to the unorganized nature of the industry, many players will want to enter the industry to enjoy the established market and reap advantages of economies of scope. Also the SSI policy of the Govt have given a tremendous boost to this kind of initiatives by small players by declaring its reservation policy and also exempting it from several kinds of taxes.

Thus on one side it is evident that any player can make a smooth entry into the market as also highlighted by the fact that higher product differentiation is possible in this plastic industry due to the diverse and enormous usage potential this material possess. But at the same time after entry getting business is really tough since there are small firms but in huge nos. with limited capital. So if a big firm enters, it can wipe out the market share and profit margins of a no of small players as its having sufficient capital to spend heavily on promotional and advertising activities along with huge investments in R & D to discover and launch new products. Also consumers generally value reputed brands so its also essential in this industry for a new entrant to invest heavily to establish a strong brand reputation and awareness. Producers who are diversifying into the above industry from some other related segment have better chance of success than completely new entrants.

Another challenge foe a new entrant is the experience curve effect due to which existing players enjoys significant cost advantage but the new entrant stands at a cost disadvantage.

Access to raw materials, technological know-how, key-inputs are however difficult for a new entrant as the industry is already having few big players and several small players already engaged in competition. Thus each of them is having contracts with a fixed set of suppliers as well as customer base ,thereby indicating the fact that its very difficult for a new entrant in this scenario to steal business from existing players.

Thus only big firms can enter this kind of market having sufficient capital at hand. As for the existing small firms therefore the threat is high and might prove damaging to a large extent.
THREAT OF SUBSTITUTES

With the growing alertness against the use of plastic in daily life at an alarming rate, there is a threat of close substitutes. The following gives a brief outlook on such threats:

1. **GLASS**

This is a very close substitute coming up in the market. Although with the growing awareness against the use of plastic, still it seems that human beings will have a tough time to live without it but nowadays there are materials that can make this possible. Quite often, plastics contain bisphenol A (BPA) or phthalates which helps in making it shatterproof, durable & flexible thereby enabling its usage in baby bottles, compact discs, storage containers and toys. This substances can cause malfunctioning of the body’s endocrine system leading to hormonal, developmental and reproductive problems. Thus the usage of glass, which is devoid of such harmful chemicals, is highly recommended.

2. **PHB BIOCOMPOSITES**

Recent researches have invented a substance which is completely biodegradable and environment friendly and can replace plastic because of similar properties and usage domain. Chemically, it is a modified form of polyhydroxybutyrate (PHB). Natural fermentation process of bacteria produce polyhydroxybutyrate, an energy and carbon source and this new substitute is a chemical modified form of PHB and hence the name. It is quite similar to polypropylene. It can be used in packaging, agriculture and biomedical products.

3. **LIQUID WOOD**

Prepared from pulp based lignin is another substitute called Liquid wood with biodegradability and comparable properties is a promising new bioplastic, or biopolymer. Lignin is mixed with water and exposed to high temperatures and high pressure to create a moldable composite material that’s strong and nontoxic, making it a good plastic substitute. This has been used to manufacture a variety of items including toys, golf tees and even hi-fi speaker boxes in Germany.

4. **ECM BIOFILM**

An additive invented by ECM Biofilms. Inc when added as an ingredient in polyolefin packaging and products makes those products biodegradable. The resulting plastic produced with this additive in the process is insensitive to heat or light degradation; this gives it a long shelf life. However, it completely biodegrade into the soil between 9 months and 5 years. Hence, single-use plastics such as disposable diapers, trash bags and food containers (including fast-food containers) could be a little more environmentally friendly due long shelf life and reusability.
5. POLYACTIDES (PLA)

Polylactides (PLA) are corn-based plastics having better properties than the real plastic. For Example: (a) Decomposability: < 47 days (b) No smoke when burned (c) Approx. 20 to 50 percent lesser usage of fossil fuels in their production than petroleum-based plastic. Food storage containers as well as general consumer goods storage can be made from this. If Walmart used 114 million PLA containers a year, company executives estimate they could save 800,000 barrels of oil each year. Cornstarch bags because of above properties could be a complete substitute to petroleum-based plastic bags. So it’s evident that in view of the growing anti plastic campaign accompanied by innovative research pose a serious threat to plastic as far as substitutes are concerned.

8. SWOT ANALYSIS OF THE INDIAN PLASTIC INDUSTRY

STRENGTHS: (a) India has a solid base in polymers (b) enjoys cheap labor (c) produces huge quantity of recycled plastic.

WEAKNESSES: (a) High cost of finished plastic products (b) suffers from low productivity of workers (c) outdated machinery and equipments (d) derogatory industry image (e) lack of focus on exports

OPPORTUNITIES: (a) Plasticulture still at a nascent stage in India holds immense opportunities (b) Entering high priced processed plastic exports segment (c) Demand generated by industries like Retail etc.

THREATS: (a) ever increasing crude oil prices (b) import threat from Middle east (c) Neighboring countries specializing in processing industries could lead to imports (d) Replacement threat from substitutes.

Porter also identified four factors that help firms in an industry to gain and sustain competitive advantage and the same can be seen in the Indian plastic industry context:

A) FACTOR CONDITIONS: India has huge pool of skilled labor (chemical engg. graduates, graduates in polymer technology etc and other allied engg. graduates) as well as a large chunk of unskilled labor available at a cheap rate. Because of the various initiatives and liberal policies declared by govt. promoting the growth of this industry in India has really helped industrialists and business houses in setting up their manufacturing units in different places across the country.

B) DEMAND CONDITIONS: The diverse nature in living conditions mainly due to climatic diversity and cultural differences propelled with heterogeneous incomes have led to a great variety in demand for different kinds of finished products in this sector to suit varying living standards. From mediocre to premium segments, each one is

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11 Royte
demonstrating divergent tastes and preferences and hence the firms in the Indian plastic industry are finding ample opportunities to earn positive economic profits.

C) RELATED & SUPPORTING INDUSTRIES: A few big players like RIL, IPCL, Haldia Petrochemicals having a network of trusted suppliers and a host of supporting industries like the chemical industries supplying the essential intermediaries and other requisites during the manufacturing process are really facilitating the growth of this industry. Also there are several small firms producing products that serve as raw materials or inputs to the above mentioned big players.

D) COMPETITIVE RIVALRY: Rivalry is huge in the Indian plastic market with the vast no. of players operating in different scales. As pointed out before, positioning and differentiation are playing a key role therefore in this market thereby helping the vast no of firms to establish their own customer base and make profits. Price wars are common in this market.

9. CONCLUSION

Thus from the above analysis its evident that the plastic industry in India is highly heterogeneous in nature due to the diverse nature and size of firms playing in the field. 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. Its 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.

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