This methodology note stands superseded. Refer to ICRA's website www.icra.in for the Corporate Credit Rating Methodology document to understand ICRA's rating approach.

Rating Methodology for Paper Industry

The following note identifies the key factors considered by ICRA in assessing credit risk in the Indian paper industry. The objective of this note is to help investors, issuers and other market participants understand how ICRA analyses creditworthiness of entities in the Indian paper industry. ICRA's analysis focuses on the following key rating factors that are common to assigning ratings in the sector. The key rating factors are:

- **Business Risk Analysis**
  - Market positioning w.r.t. scale of operations
  - Product profile, sales channel and geographical mix of sales
  - Extent of integration and level of modernization of manufacturing facilities
  - Demand-supply scenario, capacity utilisation levels
  - Raw material mix, competition and sourcing arrangements
  - Cost-structure analysis and efficiency drivers
  - Environmental impact of the mill
- **Financial Risk Analysis**
  - Revenue growth drivers
  - Contribution analysis
  - Working capital management and liquidity
  - Scale of capital expenditure and sufficiency of funding availability
  - Foreign Exchange Risks
  - Financial statements analysis, ratios and peers benchmarking
- **Promoters/Management Quality**

Business Risk Analysis

Market positioning w.r.t. scale of operations

Scale of Operations: The Indian paper industry is highly fragmented, with more than 700 paper mills with an annual paper and paper board manufacturing capacity of ~12 million metric tons[1] resulting in an average unit size of ~ 18000 metric ton per annum (MTPA).

However the level of fragmentation is significantly different if we have to analyze paper mills based on raw material consumed, which mainly includes three categories, i.e.

a) Wood/Chemical-pulp,
b) Waste paper and
c) Agro-residues;

Due to the high capital costs, constraints in securing a suitable location having abundant forest reserves, water availability and environmental clearances, pose as significant entry barriers for new entrants in the greenfield wood/chemical pulp based paper mills segment. As per ICRA's estimates, the average size of a paper mill in this segment will be upwards of ~3.0 lakh tone per annum, which is significantly higher than the overall average for the paper industry, hence has a larger scale of operations and lower fragmentation than other segments of the industry. For further details please refer to annexure 1.

Product profile, sales channel and geography mix of sales

Due to the difference in the nature of raw material consumed, the mill's product profile is different and due to this difference in level of fragmentation based on raw material, the level of competition differs significantly among different product segments. For further details please refer to annexure 2.

[1] ICRA estimates as on end of FY14

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Sales Channel: Paper is largely consumed by many small printers who work on behalf of various publishers/ FMCG companies; hence most of the sales of the paper mills are typically through dealers/indentors who source orders from these printers and act as an interface between the mill and the customers.

These dealers are also responsible for customer servicing and payment collections on behalf of mills. Apart from the dealer's network, many paper mills also have direct tie-ups with corporates, publishing houses or direct supplies under government tenders. A well-distributed dealer profile and eligibility/nomination for supplies under corporate/ government supplies improves the ability of the mill to channelise the production towards the network which offers better sales realization.

A long association with dealers/customers also improves their ability to push volumes during periods of oversupply in the markets. Within all the paper product segments, copier paper is the main product, where it is directly consumed by the end customer and hence product branding in this segment provides some pricing power.

Geographical Mix of sales: On the whole, as a country, while the paper exports are less than 10% of the total domestic production; these are also largely restricted to the value added products. Mills located near the port have an added advantage. They capture the export markets and divert the production from domestic markets in situations of domestic oversupplies.

ICRA also notes that the domestic paper demand is skewed with relatively lower consumption in eastern and north-eastern India due to lower per-capita income as well as lower economic activity in these regions, which may result in sale concentration towards high demand markets, especially that of Western India.

- **Extent of integration and level of modernization of manufacturing facilities**

Extent of Integration: Due to captive pulp capacities, the chemical-pulp based paper mills have the highest level of backward integration, as they also need captive power generation capacities to consume the black-liquor generated as a part of the pulping process. This is in contrast to waste-paper/agro-residue based paper mills, which don't require captive pulping capacities and the need to have a captive power plant is optional as the plant can be operated on grid power.

While backward integration provides better profitability margins, high capital costs also increase the vulnerability of mills to any declines in capacity utilization levels or profitability in comparison to waste paper based mills. Accordingly, while comparing the operating profit margins, these are seen in relation to return on capital employed due to the difference in capital intensities of the mills. However the backward integration has its own advantages and disadvantages which is further detailed in annexure 3. Hence a balanced approach towards backward integration to reduce the degree of operating leverage is positive.

Level of Modernization: The paper machines though can be operated for decades after periodic rebuilding and regular maintenance. However such machines may also have operational inefficiencies such as high power/ steam consumption norms in relation to new mills. This apart, the product quality and machine utilization may also suffer from breakdowns resulting in operational in-efficiencies. Very old machines thus may not result in a sustainable cost advantages in longer run. This apart, the captive power plants, with efficient steam consumption norms for power generation may also reduce the fuel requirements as part of manufacturing process.

Demand-supply scenario, capacity utilisation levels

Demand-Supply Scenario: Given the low per capita paper consumption in India in relation to global averages as well as compared to various other peers, India has witnessed steady growth in paper consumption, which is in contrast to many developing countries, which have seen demand contractions.

While the overall demand can be expected to grow in the long-term, however, various products may witness periods of demand slowdown or excess supplies. For example, during periods of economic slowdowns, leading to lower advertisement volumes, the newsprint demand witnesses a slowdown and sometimes even contraction.

Products manufactured by chemical pulp based mills (coated paper/copier paper) witness temporary supply pressures as large scale capacity addition (given high average mill size in this segment) leads to large capacity additions, which is in contrast to steady consumption growth in these product segments, thereby taking time for capacity absorption.

Accordingly, ICRA assesses the major capacity addition being done in particular product segments by various players to ascertain demand/supply pressures and consequent profitability pressures which may arise and can be foreseeable in the near to medium term.

Capacity Utilisation: The paper industry is highly capital-intensive, requiring significant investments in plant & machinery. The typical cost of a paper plant can cost ~Rs 20000 MTPA to ~Rs 90000 MTPA depending on the extent of integration in captive wood pulp manufacturing capacity, power plant capacity and the nature of expansion, i.e. greenfield or brownfield.

Given the capital intensiveness, the need to part-fund the expansion through debt and consequent interest and repayment burden, the operating leverage in the sector is high. As a result, the ability to consistently operate the machine at high capacity utilisation levels and ability to rapidly ramp-up the production from a newly commissioned unit is of utmost importance to reduce the capital costs per unit of production.

The capacity utilisation of various players varies from 70% level to ~100% levels with average industry-wide utilisation of upwards of 85% during last decade, with variations of ± 5% depending on the demand-supply scenario. The ability to consistently operate at higher than average industry utilisation which in turn is a function of various parameters like product profile, diversification of sales network, level of modernization, competitive cost structure and regular availability of power, are considered positive attributes.

○ Raw material - competition and sourcing arrangements

As discussed earlier, paper mills can largely be classified in to three broad raw materials categories, i.e. chemical pulp, waste paper and agri-residues. Mills typically use a combination of these fibres to optimise between the product quality and cost of production.

The domestic paper industry irrespective of the nature of raw material being used suffers from significant fibre shortage. The wood based paper mills suffer from constraints via government policy to restrict land holdings and the ability to source wood from captive plantation.

Accordingly, these wood-based mills compete for the limited forest resources, and encourage farmers to undertake farm forestry. The farmer's interest in farm forestry is also based on the profit which they can earn by sowing alternate crops on their land as well as constraints of longer cash-flow cycle in farm forestry as it can take upto 3~5 years before farmer generates cash by undertaking farm-forestry.

Simultaneous capacity expansions during the last few years (2009-2014) lead to severe competition among mills for wood procurement and consequently an increase in wood prices leading to requirements for importing wood without a corresponding increase in product realisation.

Similarly, due to low collection rate of waste paper, ~50% of the waste paper requirements are imported by the industry. Also due to the alternate use of agri-residues as fuel and their seasonal availability, the ability to source them at competitive prices also remains a challenge for the mills. As a result, the prices of all the raw materials have consistently increased over time.

The initiatives undertaken by mills to control the increase in raw material costs by efficient sourcing and ability to pass these costs on, on a sustained basis remain critical determinants of profitability.

○ Cost-structure analysis and efficiency drivers

Raw Material: The cost structure of the paper mills vary significantly based on the raw material being used by the mill. A wood-based paper mill will have relatively lower raw material cost (~31 ± 2% of sales) as compared to waste paper based mill (~52 ± 3% of revenues). While the raw material cost for wood-based paper mills is lower, given that pulp yield from wood (air dried) is only 40% by weight as against ~90% yield of waste paper mill, the average cost of raw material per ton of paper is higher for a wood-based paper mill compared to wastepaper-based mill.

Power & Fuel: The power consumption (number of units per ton of production) for a wood-based paper mill is higher than a wastepaper-based mill due to significant power consumption in the pulping process. However given that wood-based paper mills generate black liquor as part of their pulping process, which in turn is used as fuel for power generation, hence despite higher units of power consumption by wood based paper mills, the P&F cost for both the mills typically remains similar at ~ 15% (±2%) of sales.

Chemical consumption: The wood based paper mill mainly consumes the chemicals in the pulping and bleaching process. This apart, all the paper mills use chemicals as binding, coating and filler materials in the paper manufacturing process. Accordingly, the chemical consumption is significantly higher at ~20 ± 2% of sales for wood based paper mills compared to ~11 ± 1% of sales for waste paper based mills.

Employee/Manpower expenses: Due to higher labour intensity owing to a longer manufacturing process, the manpower requirements in an integrated wood based paper mill typically tend to be higher than waste paper based mills. Accordingly, the manpower cost is higher at ~7 ± 0.5% for integrated paper mills compared to 4.5 ± 0.5% for waste paper based mills.

Selling and G&A expenses (SGA): These expenses also vary significantly depending on the nature of the mill, whereby the integrated pulp mills have SGA expenses of ~ 6 ± 0.5% of sales, which is higher than ~4 ± 0.5% of sales for waste paper based mills. This in turn is due to the remote locations (in forest areas) as well as the need to a larger establishment set-up of an integrated paper mills when compared to a waste paper based mills.

While the raw materials, chemical and selling expenses tend to be largely variable in nature, a significant part of P&F, employee and G&A expenses are fixed in nature leading to high operating leverage and the need to operate the production capacities at high utilisation levels to reduce per unit cost of production.

○ Environmental impact of the mill

Apart from concerns related to consumption of forest resources by chemical woodpulp-based paper mills, the concerns also emanate from the water consumed in the paper manufacturing process. Water is consumed throughout the paper manufacturing process, which includes wood washing, cooking, pulping, bleaching and paper making. Apart from the level of water consumption, the chemicals used in various processes, also raised concerns related to quality of effluents from the paper mills, if not treated properly before discharge.

With the entire process of paper manufacturing, due to the use of chlorine in the pulp bleaching process and consequent production of absorbable organic halides (AOX), which in turn increased the biological/Chemical oxygen demand (BOD/COD) of the effluents from the paper mills has been the key concern for the chemical pulp based paper mills. Over the last decade, subsequent to India being a signatory to Monteral protocol with commitments to reduce the halons among other ozone depleting substances, most of the chemical pulp based paper mills have shifted to elementary chlorine free (ECF) process for pulp bleaching. Mills not adopting ECF bleaching will be required to undertake capital expenditure on existing facilities.

Also, given the significant power consumption in the entire manufacturing process and captive power generation facilities set-up for meeting power requirements, the approvals and consent of pollution control boards for operating the power plant and meeting the effluent discharge norms of paper mill as specified by the pollution control board is also seen. Recently in February 2013, various paper mills in the state of Uttar Pradesh, despite having consent from pollution control boards to operate, were issued a notice of temporary closure to prevent water pollution in river Ganga amid the Kumbh pilgrimage event. As a result of such unforeseen events resulting in the temporary disruption of operations, the financial liquidity of the mills becomes important to sustain their fixed expenses and service debt obligations.

Financial Risk Analysis

Apart from the operational risk profile, the rated entity's financial profile is also an important consideration from a credit perspective. While ICRA believes that the strong operational profile drives strong financial profile in the long term, however the risk appetite also governs the financial profile of the entity and growth plans of the management. Accordingly, while assessing the financial risk profile, apart from the past and the current financial position, ICRA also takes the growth plans of the company and its impact on financial position in future. The past and the current financial position can be analyzed by the financial statements of the company, financial ratios and suitable adjustments in accounts to align them with accounting principles and also make them comparable for meaningful peer comparison.

○ Revenue composition and sale realisation

While analyzing the revenues, it is sub-categorized into revenues derived from the manufacturing and trading activities and the factors driving the revenue growth are analyzed. For the manufacturing revenues, the growth due to volumetric growth and growth in sales realizations is analyzed to assess the drivers for growth. ICRA notes that the volumetric growth of the paper mills is constrained by their capacities and unless there is some capacity addition, the volumetric growth remains a constraint and only nominal volumetric growth can be achieved by efficiency gains and de-bottlenecking.

The realization growth in turn is seen in relation to the hikes witnessed by the mills in their input costs, and ability to pass on these costs pressures by way of price hikes is considered positive. These apart, the revenue break-up by product categories, and other operating income (such as export incentives, power exports etc) are analyzed along with volumetric data to assess the product-wise sales realization and share of value added products in the total revenues.

Once the levels of sale realizations are established, these are compared with the industry trends and the reasons for variance vis-à-vis industry trends are analyzed and the factors which can sustain or impact these trends are looked into. Revenues derived from the related parties/group companies are assessed for their arms-length transactions and accordingly, if required, the profitability levels are seen in relation to the nature of these transactions.

○ Contribution analysis and profitability

Similar to analysis for commoditized products, where the gross and net contribution levels are measured in terms of profit per unit of sales, ICRA also assesses the contribution margins per ton of paper sales. The cost structure is analyzed for per ton of production not only in terms of consumption norms but also in terms of unit cost of production to assess the key cost drivers and the movement in these factors. Subsequently, the ability of the company to pass on the increases is assessed based on its ability to retain/improve gross/net contribution levels.

The profitability margins in terms of ratios like OPBDITA/OI (operating profits before depreciation, Interest and amortization / Operating Income) and PAT/OI (Profit After Tax / OI) are seen in relation to changes in the contribution margins. A mere decline in profitability margin with stable contribution margins (Rs/Kg or Rs/MT) is not necessarily seen negatively. These apart, the above profitability margins are also seen in relation to the overall return on capital. Higher OPBDITA margin due to backward integration in pulping and power capacities (requiring more capital) is also seen in relation to return on capital employed (RoCE[2]), which in turn is seen in relation to the cost of the capital. While the company may have an OPBDITA margin similar to or better than industry average, if the RoCE is lower, then the reasons for the same are analyzed, which can be lower fixed asset turnover or longer working capital cycle than industry average.

○ Working capital management, liquidity

Receivable Cycle: The sales of the paper mills typically remained well spread throughout the year with slightly higher sales (~3~5% higher than average) in Q4 of the financial year (April – March). However the receivable period of the paper mills vary between 30~60 days, with larger mills (mainly based on chemical wood pulp) having better bargaining power with its dealers, extending a credit period of ~30~35 days as against smaller mills (largely waste paper based) with relatively lower bargaining power offering average credit period of ~45 days.

Apart from the overall receivable position, the debtor aging analysis (its comparison with eligibility for drawing power) and debtor concentration towards few entities are also analysed to assess the quality of receivables. For export receivables, the credit risk mitigants such as Letter of Credit (LC) backed receivables are also taken as comfort factors.

Inventory Holdings: The inventory holding for the larger wood based mills typically averages around ~90 days, and is higher than ~ 45~50 days of inventory held by wastepaper-based mills. The higher inventory level of larger mill is in turn driven by the need to stock higher raw material stocks due to the lack of steady availability as against stable availability of waste paper.

Apart from the overall inventory, the inventory mix in terms of raw material, finished goods and work-in process are also benchmarked in relation to the industry average.

Payable Cycle: The payable period for the larger wood based mills typically averages around ~80 days as against ~45 days for waste paper based mills due to the better bargaining power of the larger mills.

Overall, the working capital intensity of paper mills in the wood segment averages ~ 20% of their revenues and ~25% of revenues for the waste paper mills.

[2] RoCE is defined as profit before interest and taxes / average capital employed for the year

Given the capital intensiveness of the sector and high leveraging of players in the sector leading to sizeable repayment obligations, it necessitates the need for maintaining liquidity for ensuring timely repayments. ICRA measures the liquidity by comparing fund-based working capital limit utilisation with sanctioned fund based working capital limits or drawing power, whichever is lower and assessing the cushion which is available in working capital limits for debt servicing on a consistent basis.

○ Scale of capital expenditure and sufficiency of funding availability

The growth for a paper mill is typically driven by capacity expansions, apart from minor de-bottlenecking, which can add upto ~15~20% of the existing capacity. Typically the new paper mill may take a period of upto 12~18 months to fully stabilize its operations and thereafter de-bottlenecking is undertaken gradually to fully utilize the potential of the machine. Due to high capital requirements and hence the need to take debt for funding capex, the debt servicing burden is typically higher in the initial years of capacity expansion. Depending upon the market conditions, it may take ~4~5 years for a mill to reduce its debt burden and plan for further expansion.

However, the expansions can require substantial capital outlays due to the capital intensiveness of paper machine. While the company may have DSCR >1 over the projected period, ICRA also notes the sufficiency of the balance cash accruals (after meeting scheduled repayment) to fund the equity margin required for funding the capex. If the projected levels of cash accruals (after repayments) are lower than equity funding requirement for capital expenditure and enhanced working capital requirements, then despite a satisfactory projected DSCR, the company may find itself stretched on liquidity. In such a situation, the financial flexibility of the company to fund its growth requirements is seen as an important factor.

○ Foreign currency related risks

Foreign exchange for paper mills can arise on account of revenue, cost and liability items. Companies that export paper can have foreign currency receivables, whereas those importing waste paper or pulp will have foreign currency payables. This apart, many large wood-based paper companies avail foreign currency loans partially due to availability of cheaper and longer credit from exim banks of the countries where key machinery manufacturers are located.

ICRA assesses the foreign currency risks by calculating the overall un-hedged exposure and effectiveness of the hedge by comparing the tenure of the hedges in relation to the tenure of the exposure.

○ Financial Statement analysis, ratios and peer benchmarking

Companies that pursue an aggressive financial policy, including heavy reliance on debt financing, are likely to be more vulnerable to cyclical downturns than companies that employ a lesser degree of financial leverage in their business. ICRA takes into account the financing pattern of long term and short term assets with reference to the company's long term and short term debt.

The paper industry, being fixed capital intensive, results in high funding requirements and depending on the stage of the last capex undertaken by the company the debt coverage indicators may vary significantly vis a vis peers for a given level of capacity.

Some of the key indicators observed by ICRA and used for peer benchmarking include –

- Profitability ratios: Operating profit margins, Net Profit margin, Return on capital employed
- Asset Turnover Ratios: Operating Income/Gross Block, Revenues/capital employed
- Leverage indicators: Total Debt/Tangible Net Worth, Total Outside Liabilities/Tangible Net Worth, Total Debt/OPBDITA
- Debt coverage ratios: Interest Coverage, DSCR, Net Cash Accruals/Total Debt
- Liquidity ratios: Current Ratio
- Cash Flow ratios: Operating Cash flows/(Interest + Debt Repayment), Operating Cash flows/Total Debt, Retained cash flows/Total Debt

Low leverage improves the financial flexibility of the company during downturns, besides keeping the fixed financing expenses low. Moreover, the tenure of the term debt is a key driver for the debt coverage as companies with longer tenure debt and similar levels of leverage will be more comfortably placed as compared to companies with shorter tenure debt.

Apart from the above financial parameters, off balance sheet exposures/ contingent liabilities and likelihood of these liabilities getting materialized are also taken into account while assessing the credit profile.

Promoters/ Management Quality

All debt ratings necessarily incorporate an assessment of the quality of the issuer's management, as well as the strengths/weaknesses arising from the issuer's being a part of a "group". Also of importance are the issuer's likely cash outflows arising from the possible need to support other group entities, in case the issuer is among the stronger entities within the group. Usually, a detailed discussion is held with the management of the issuer to understand its business objectives, plans and strategies, and views on past performance, besides the outlook on the (issuer's) industry. Some of the other points assessed are:

- Experience of the promoter/management in the line of business concerned
- Commitment of the promoter/management to the line of business concerned
- Risk appetite of the promoter/management and risk mitigation plans
- The issuer's policies on leveraging, interest risks and currency risks
- The issuer's plans on new projects, acquisitions, expansion, etc.
- Strength of the other companies belonging to the same group as the issuer
- The ability and willingness of the group to support the issuer through measures such as capital infusion, if required

Periodic interactions with the management provide insights into the operations of the company and ongoing developments and further help understand the management's commitment to the business and strategies. The interactions with the management also help ICRA estimate the probability of the management's tendency to deviate from its business philosophy in times of stress.

Summing Up

ICRA's credit ratings are a symbolic representation of its opinion on the relative credit risk associated with the instrument being rated. This opinion is arrived at following a detailed evaluation of the issuer's business and financial risks, its competitive strengths, it's likely cash flows over the life of the instrument being rated and the adequacy of such cash flows vis-à-vis its debt servicing obligations and other funding requirements. The credit profile of paper companies involves an assessment of the business strength and weaknesses as reflected by their scale of operations, operating efficiencies owing to their presence in highly competitive product segment and diversifications in terms of product, sales and distribution network. The operational strengths are typically reflected in financial performance. However the financial risk profile for company is also governed by their future growth plans and given the high leveraging in the sector, the ability to fund these growth plans is also seen. These apart, given the cyclicality in the sector arising out of excess supplies due to the bunching up of capacity additions in products having relatively smaller markets or demand slowdown in product segments of the company are also governing factors.

o Annexure 1

Scale of Operations and level of fragmentation: As discussed earlier, based on the raw material consumed, the paper mills can be broadly categorized into three categories, i.e.

a) Wood/Chemical-pulp,
b) Waste paper and
c) Agro-residues;

As per industry data, based on the raw material mix, ~35% of the capacity is based on chemically bleached pulp (either from wood or agri-residues); ~44% capacity is based on waste paper and ~21% of production capacities are based on agri-residues. Based on the raw material consumption mix, ICRA observes that the level of fragmentation is relatively different with relative higher consolidation in chemical pulp based paper mills.

a) Wood/chemical-pulp based mills

Greenfield wood/chemical-pulp based paper mills; due to its high capital cost, constraints in securing a suitable location having abundant forest reserves, water availability and environmental clearances, pose as significant entry barriers for new entrants.

Accordingly, ICRA has noticed no new entrant in this segment, and all the existing players in this segment have been present for over decades. Accordingly, there is a relatively higher level of consolidation within this segment of the industry with ~10 players accounting for almost the entire production capacities based on chemical pulp.

While the chemical pulp is largely manufactured from wood, however some large players like TNPL, Trident Limited and Seshasayee Paper also use agro-residues for the manufacturing of chemical pulp.

As per ICRA's estimates, the average size of the paper mill in this segment will be upwards of ~3.0 lakh tonne per annum, which is significantly higher than the overall average for the paper industry.

The key players in this category will be BILT limited, ITC limited, JK Paper Limited, TNPL limited, West Coast Paper Mills Limited, Century Paper mills limited, Seshasayee Paper and board limited, International Paper APPM Limited, Orient Paper Limited and Trident Limited.

b) Waste Paper based mills

Unlike chemical-pulp based mills, wastepaper-based mills have lower entry barriers and hence have a higher degree of fragmentation. Low entry barriers arise on account of low capital costs as the need for captive pulp manufacturing capacities as well as need to necessarily have captive power plant are negated. Further, some players add capacity through imported second hand paper mills, which further lower the capital costs.

In addition, the water, electricity and chemical requirements are significantly lower than chemical pulp-based paper mill, which results in lower effluents and environmental concerns in comparison to chemical pulp based paper mill, thereby easing the approval process for new entrants.

Accordingly, as per ICRA's estimates, this segment witnesses mills ranging from 5000 MTPA capacities to 3 lakh MTPA capacities and average mill size of ~13000 MTPA. Some of the prominent mills in this segment are Emami paper mills limited, Khanna Paper mills limited and Rainbow paper mills limited.

c) Agro-residues based mills (without chemical bleaching)

Similar to wastepaper-based mills, the entry barriers in agro-residue (such as wheat straw, sugarcane bagasse, rice straw etc) based paper mills are lower than chemical pulp-based paper mills. However given the need to set-up these mills closer to raw material source so as to reduce the transportation cost of agri-residues, as well as limited potential of sourcing agri-residues with the natural catchment of the mill, i.e. a radius of ~200 KM from mill; the average mill size in these categories typically tend to be even lower than waste paper based mills.

Due to difference in the nature of raw material consumed, mills' product profile is also different and due to this difference in the level of fragmentation based on raw material, the level of competition also differs significantly among different product segments.

o Annexure 2

Product Profile segmentation based on raw material: Typically the products segmentation based on the source of the raw material use is as under:

a) Wood/Chemical-pulp based mills:

Writing printing paper – Maplitho paper, Copier paper and Coated Paper
Board – Flexible packaging board
Tissue paper

b) Waste Paper based mills:

Writing printing paper – Largely cream-wove
paper Newsprint
Board – Duplex packaging boards, Kraft paper

c) Agri Residue based mills:

Kraft paper for corrugated boards

Apart from above product segments which have a large market, hence are commoditized products, there are specialty grade papers such as thermal sensitive paper, electrical grade paper etc; however these have a relatively smaller market size.

Chemical-pulp based mills: Given the commoditized nature of the major paper products segments, their presence in high value added segments (manufactured from chemical-pulp) coupled with relatively lower fragmentation in these product segments results in relatively better sales realizations as well as profitability margins.

However, these product segments because of their high-value added nature are also the most vulnerable to import threats especially during periods of declining international prices. Hence the ability to maintain competitive prices vis a vis imports, while maintaining a competitive cost structure to compete with imported products amid declining import duties remain the key driver of the profitability for the companies in these product segments.

Waste Paper/Agro-residue based mills: Waste paper and agro-waste based mills on the one hand enjoy relatively large market size for their products as mentioned earlier. However, given the low value addition of converting waste paper/agro-residues into finished paper, and high level of fragmentation with the presence of many small players, it results in relatively high competition and lower profitability margins.

With limited pricing power and low margins, the ability to source the waste paper/agro-residues at competitive prices is of utmost importance, apart from controlling other manufacturing costs. As a result, the location of the mill near the paper consumption centre (hence waste generation centers) or near the port, if dependent on imported waste paper becomes important, so as to reduce the landed cost of waste paper.

- **Annexure 3**

Advantages/disadvantages of integration: Pulp and paper are two separately traded global commodities and their prices are inturn driven by their own demand-supply scenarios. For example, Chile (South America), which accounts for a sizeable portion of world's pulp production, witnessed an earthquake in February 2010, leading to spurt in global pulp prices due to damages it caused to its pulp manufacturing industry. While this event benefited the integrated paper mills with captive pulp capacities in FY11 as their input costs (wood) saw limited increase in prices; however waste paper based mills saw a sharp increase in their input costs as the waste paper and pulp prices move in-tandem.

In contrast, when the pulp prices declined internationally in FY10 due to a global economic slowdown, the integrated paper mills were not able to take the advantage of the decline in input costs, whereas the waste paper mills benefited. Hence backward integration provides advantages of lower costs. However requirements for increased capital investments also increases the fixed costs related to debt servicing thus increasing the vulnerability during the downturn in pulp prices.

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