Chapter - II

Origin and Growth of Paper Industries in Indian Context
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ORIGIN AND GROWTH OF PAPER INDUSTRIES IN INDIAN CONTEXT

History of Paper Technology in India

Paper making is one of the inventions by Chinese. 105 A.D. is often cited as the year in which papermaking was invented. In that year, historical records show that the invention of paper was reported to the Eastern Han Emperor Ho-di by Tsai Lun, an official of the Imperial Court. Recent archaeological investigations, however, place the actual invention of papermaking some 200 years earlier. Tsai Lun broke the bark of a mulberry tree into fibres and pounded them into a sheet. Later it was discovered that the quality of paper could be much improved with the addition of rags hemp and old fish nets to the pulp. The paper was soon widely used in China and spread to the rest of world through the Silk Road. An official history written some centuries later explained:

In ancient times writing was generally on bamboo or on pieces of silk, being expensive and bamboo heavy, these twitch materials were not convenient. Then Tsai Lun thought of using tree bark hemp, rags, and fish nets. In 105 A.D he made a report to the emperor on the process of paper making, and received high praise for his ability. From this time paper has been in use everywhere and is called the "Paper of Marquis Tsai."

In few years, the Chinese began to use paper for writing. Around 600 A.D. woodblock printing was invented and by 740 A.D the first printed newspaper was seen in China.

To the east, papermaking moved to Korea, where production of paper began as early as the 6th century AD. Pulp was prepared from the fibers of hemp, rattan, mulberry, bamboo, rice straw, and seaweed. According to
tradition, a Korean monk named Don-cho brought papermaking to Japan by sharing his knowledge at the Imperial Palace in approximately 610 A.D, sixty years after Buddhism was introduced in Japan.

Along the Silk Road, we learned that paper was introduced to Xinjiang area very early according to the archaeological records. The paper found at Kaochang, Loulan, Kusha, Kotan, and Dunhuang sites dated as early as the 2nd Century. The technique eventually reached Tibet around 650 A.D and then to India after 645 A.D. By the time Hsuan Tsang from China arrived to India in 671 A.D paper was already widely used there.

For a long time the Chinese closely guarded the secret of paper manufacture and tried to eliminate other Oriental centers of production to ensure a monopoly. However in 751 A.D the Tang army was defeated by the Ottoman Turks at a mighty battle at the Talas River. Some Chinese soldiers and paper makers were captured and brought to Samarkand. The Arabs learned the paper making from the Chinese prisoners and built the first paper industry in Baghdad in 793 A.D. They too kept it a secret, and Europeans did not learn how to make paper until several centuries later the Egyptians learned the paper making from the Arabs during the early 10th century. Around 1100 A.D. paper arrived in Northern Africa and by 1150 A.D it arrived to Spain as a result of the crusades and established the first paper industry in Europe. In 1453 A.D Johan Gutenberg invented the printing press. The first paper industry in the North America was built in Philadelphia in 1690.

Paper is a thin material mainly used for writing upon, printing on, drawing or for packaging. It is produced by pressing together moist fibers, typically cellulose pulp derived from wood, rags or grasses, and drying them into flexible sheets.

Paper is a versatile material with many uses. Whilst the most common is for writing and printing upon, it is also widely used as a packaging material, in
many cleaning products, in a number of industrial and construction processes, and even as a food ingredient — particularly in Asian cultures.

Paper and the pulp papermaking process was said to be developed in China during the early 2nd century AD by the Han court eunuch Cai Lun, although the earliest archaeological fragments of paper derived in the 2nd century BC in China.

The oldest known archaeological fragments of the immediate precursor to modern paper date to 2nd century BC in China. Papermaking is considered as one of the Four Great Inventions of Ancient China, and the pulp papermaking process is ascribed to Cai Lun a 2nd century AD Han court eunuch. With paper an effective substitute for silk in many applications, China could export silk in greater quantity, contributing to a Golden Age.

Paper spread from China through the Islamic world to medieval Europe in the 13th century, where the first water-powered paper mills were built. In the 19th century, industrial manufacture greatly lowered its cost, enabling mass exchange of information and contributing to significant cultural shifts. In 1844, Canadian inventor Charles Fenerty and German F.G. Keller independently developed processes for pulping wood fibers. This ended the nearly 2000-year exclusive use of pulped rags.

Introduction on Paper Industry

The new millennium is going to be the millennium of the knowledge. So demand for paper would go on increasing in times to come. In view of paper industries strategic role for the society and also for the overall industrial growth it is necessary that the paper industry performs well.

Government has completely delicensed the paper industry with effect from 17th July, 1997. The entrepreneurs are now required to file an Industrial Entrepreneur Memorandum with the Secretariat for Industrial Assistance for setting up a new paper mill or substantial expansion of the existing mill in permissible locations.
The Paper industry is a priority sector for foreign collaboration and foreign equity participation up to 100% receives automatic approval by Reserve Bank of India. Several fiscal incentives have also been provided to the paper industry, particularly to those mills which are based on non-conventional raw material.

Capacity, Production, Raw material and Import:

There are, at present, about 515 units engaged in the manufacture of paper and paperboards and newsprint in India. The country is almost self-sufficient in manufacture of most varieties of paper and paperboards. Import, however, is confined only to certain specialty papers. To meet part of its raw material needs the industry has to rely on imported wood pulp and waste paper. Production of paper & paperboard during the year 2002-03 (upto December, 2002) is 24.52 lakhs tonnes. At present about 60.8 per cent of the total production is based on non-wood raw material and 39.2 per cent based on wood.

Performance of the industry has been constrained due to high cost of production caused by inadequate availability and high cost of raw materials, power cost and concentration of mills in one particular area.

Several policy measures have been initiated in recent years to remove the bottlenecks of availability of raw materials and infrastructure development. To bridge the gap of short supply of raw materials, duty on pulp and waste paper and wood logs/chips have been reduced. The capacity utilization of the industry is low at 60%. About 194 paper mills, particularly small mills, are sick and are lying closed. Several policy measures have been initiated in recent years.

An import of paper and paper products was growing over the years. However, it has increased during 2001-02 after a fall in 2000-01. About 1,40,000 tonnes of paper was exported in 2000-01 mainly to the neighbouring countries.
India's per capita consumption of paper is around 4.00 kg, which is one of the lowest in the world. With the expected increase in literacy rate and growth of the economy, an increase in the per capital consumption of paper is expected.

Outlook

The demand for upstream market of paper products, like, tissue paper, tea bags, filter paper, light weight online coated paper, medical grade coated paper, etc., is growing up. These developments are expected to give fillip to the industry.

Indian paper industry needs the following for being globally more competitive. Sustained availability of good quality of raw materials (forest based) and bulk import of waste paper to supplement the availability of raw materials.

- Adequate modernization of the manufacturing assets.
- Improvement of the infrastructure.
- Quality improvements and reduction in cost of production
- Import policy conducive for import of material, equipment, instruments, raw materials & technologies which are bearing of the quality and environment.
- Based on the recommendations made in the Report and in consultant with the industry Associations, action plans are being finalized in consultation with other Ministries/Departments concerned. The Main Action Points proposed are as under:

Infrastructure

Improvements of key ports, roads and railways and communication facilities which will help the entire industrial sector including pulp & paper.
Raw Material

(i) For Wood Based industry:
Revision of forest policy so that plantation can be raised by industry/Cooperatives of farmers/State Government. Degraded forest land to be made available to the industry for raising plantations.

(ii) For Waste Paper based Industry:
Import of waste paper at minimum import duty. Introduction of ecolabeling system where in products made from recycled fibre is rated higher than the products made from virgin fibre. Introduction of modern and effective collection and grading system.

(iii) For Agro Based Industry:
Funds to be made available for technology up gradation for handling & processing of agro residue fibre, in small & medium scale industries.

Government Policies
Accelerated depreciation to partially mitigate high capital intensity. Allow duty free imports of new & second hand machinery/equipment for Technology Up gradation.

Energy Policy
Better availability & quality of coal. More uniform Energy Policy by States. Indian Technique of Paper Making. Rahman describes the old Indian technique of papermaking and its tools. According to Rahman, the main tools used for papermaking were: dhegi (hammer), chhapri (screen), and sacha (teakwood frame), kunchawas (soft date-palm brush), and polishing stone.

The techniques of papermaking were essentially the same throughout the country, differing only in the preparation of pulp from different materials. According to Rahman, the process of making paper from waste paper was not very difficult. The waste paper was torn to pieces, sorted according to colour, moistened with water, taken to the river and pounded with stones, and washed
for three days. It was then taken to a cistern about 7ft x 4ft x 4ft deep, half-filled with water.

The pulp was thrown into this cistern. When it was thoroughly dissolved, the workman sitting on the edge of the pit, bending over the water, took in both hands the square frame which held the screen serving as a sieve, passed it underwater and drew it slowly and evenly to the surface; such that, as the water passed through, a uniform film of pulp was left on the screen.

The screen was then lifted up and turned over, and the film of paper was spread on a rag cushion. When sufficient layers had been heaped on this cushion, about 9-14 inches high, a rag was spread over them and a plank weighted with heavy stones was laid over it. When this pressure had drained the water and some of the moisture out of the stock of paper, the stones were taken away and two men, one standing at each end of the plank, see-sawed over the bundle of paper by hand. When it was well pressed the paper was peeled off, layer after layer, and spread to dry either on the walls of the building or on rags lay in the sun. When dried, each sheet was laid on the polished wooden board and rubbed with a shell till it shone. The above process was used for making rough paper.

Rahman describes another process of glazed papermaking. According to Rahman, firstly the material was cut into small pieces, moistened with water and pounded by a heavy fixed hammer, the dhegi. Then washed with clean water and moistened with slaked lime and left in a heap on the floor for seven or eight days, then pounded again, heaped and left to lie for four days more. Again washed this material (rag) with plane water and washed material mixed with khar (impure carbonate of soda, 1 khar : 38 pulp)) overnight. This rag was again washed and again mixed with khar (1 khar : 40 pulp) and dried in the sun. And again kept in water overnight and again washed. Washed rags were mixed with country soap (1 soap: 27 rags) and pounded and dried. Then this pulp was washed again. Then placed into a cement-lined cistern, about 7ft x 4ft
Ray describes other processes of papermaking. According to Ray, the old clothes, old tents, the bark of certain shrubs and trees were washed well and soaked in water for few days; these materials were beaten with wooden hammer (dhegi). The pulp was mixed with a little water in a lime-lined (cunam) reservoir, where the beating operation was also carried out.

The workman dipped their moulds into the reservoir, and the mixture, when lifted out, would become paper. It was then removed, and each sheet drawn through a second reservoir of water and then hung up to dry in sun. A quantity of gum Arabic was dissolved in water and then the beaten pulp was placed. The water in the second reservoir, through which the sheets were drawn, also contained gum in the form of mucilage, as well as some alum dissolved in it. The moulds or forms used by the workmen were generally made of bamboo. The gum Arabic was obtained as an exudation from the babool tree.

**Modern Period**

Gondhalekar has also described the process of making handmade paper, which involved cutting, dusting and washing of the tat (discarded hessian sacks) then beating the tat under a treadmill, followed by washing. This washed mass was mixed with saji matti (naturally occurring sodium carbonate) and lime and exposed the mass to the sun in an open verandah for several days for sun bleaching. And this dried material was subjected to rewashing. And if necessary, the saji and lime treatment was repeated.

Then thoroughly stirring the pulp in a masonry vat sunk in the ground and lifting the sheet on a grass mat. After this sticking the wet sheets on lime plastered walls for drying and applying starch-paste on both sides of the dried sheet and glazing the dry sheet on a concave wooden board, with a smooth
agate burnished and finally cutting to required sizes. The above process could produce a fairly strong paper. Such paper was mainly used by the Government for state records, by priests for religious books, and by moneylenders and traders for account books.

Consistent with their policy of dismantling Indian industries, like iron, copper, textile etc, they also disbanded the native handmade paper industry. According to Bansal and Kumar (2001), the handmade paper industry was in full bloom until the early part of the 19th century and enjoyed a very special status under state patronage. The British who were now ruling India completely banned the use of hand-made paper in all government offices and they started the import of machine-made paper from Britain. A few paper mills were established in India by the end of the 19th century, as a result of which a lot of cheap machine made paper appeared in the market for public use. This further caused a severe blow to the industry and made it difficult to survive. Many people engaged in it lost their jobs.

This was a rough time for the Indian hand-made paper industry. Swadeshi movement under the leadership of Mahatma Gandhi played a positive role in reviving the handmade paper industry. For the success of the movement, Gandhiji drew the support of the manufacturers of consumer articles in the country and formed the All India Village Industries Association (AIVIA). Hand-made paper was also included in the list of village industries, which needed financial support and patronage for its products. Since there was a competitive market of cheap machine made paper of almost all varieties, it was imperative to improve the quality of indigenous products. For this purpose, in 1935, All-India Village Industries Association started a training centre at Maganwadi in Wardha (Maharashtra) under the guidance of Sri Kumarappa, a devout Gandhian and economist. This training centre was later renamed as Jamna Lal Bajaj Research Institute. In 1924, more and more paper mills of India began to use bamboo as main raw material.
Paper Industry in India

The Indian Paper Industry is among the top 15 global players today, with an output of more than 6 millions tones annually with an estimated turnover of ₹150,000 millions. (Approx. USD 3400 million). Paper Industry in India is riding on a strong demand and on an expanding mood to meet the projected demand of 8 million tones by 2010 & 13 million tones by 2020. A large number of expansion programme & expansion of capacities with an outlay of ₹. 10,000 crores have been announced covering the various sectors like paper, paperboard, newsprint etc.

The Indian Economy is progressing well and targeting 8%+ growth. The economic reforms coupled with the liberalized Government Policies, India today offers excellent business opportunity for investments. One of the first FDI Projects may come through the proposed Finnish proposal to set up a 400000 tp a capacity plant with an investment of US$240 million.

The expanding Industrial Scenario calls for efforts to tackle related problems:

- Industry needs capital and technology.
- Since energy cost accounts nearly 25 per cent of cost of production there is an urgency to improve energy management and energy consumption.
- Quantum jump in production, called for by the demand projection is possible only by expansion of existing capacity and creation of additional capability. Upgradation of technology and new capacities also involve massive investment.
- Use of agro residues for preparation of pulp also throws up challenges like pollution control, recycling, use of cost effective technology for utilization of agro residues, etc.

Types of Paper

Paper is often characterized by weight. The weight assigned to a paper is the weight of a ream (500 sheets) of varying "basic sizes", before the paper is cut into the size it is sold to end customers.
Density of Paper

The density of paper ranges from 250 kg/m\(^3\) (16 lb/ft\(^3\)) for tissue paper to 1500 kg/m\(^3\) (94 lb/ft\(^3\)) for some speciality paper. Printing paper is about 800 kg/m\(^3\) (50 lb/ft\(^3\)).

Types of Paper

- Bank Paper
- Bond Paper
- Book Paper
- Construction Paper/ Sugar Paper
- Cotton Paper
- Electronic Paper
- Fish Paper (Vulcanized fibres for electrical insulation)
- Ink jet Paper
- Kraft Paper
- Laid Paper
- Leather Paper
- Mummy Paper
- Tyvek Paper
- Paper Towels
- Wall Paper
- Washi
- Wax Paper
- Wet and Dry Paper
- Wove Paper
- Coated Paper: glossy and matt surface

Bank Paper

Bank paper is a thin strong writing paper of less than 50g/m\(^2\) commonly used for typewriting and correspondence.
Bond Paper

Bond paper is a high quality durable writing paper similar to bank paper but having a weight greater than 50 g/m². It is used for letterheads and other stationery and as paper for electronic printers. Widely employed for graphic work involving pencil, pen and felt-tip marker. It is largely made from rag pulp which produces a stronger paper than wood pulp.

Book Paper

A book paper (or publishing paper) is a paper which is designed specifically for the publication of printed books. Traditionally, book papers are off white or low white papers (easier to read), are opaque to minimize the show through of text from one side of the page to the other and are (usually) made to tighter caliper or thickness specifications, particularly for case bound books. Typically, books papers are light weight papers 60 - 90gsm and often specified by their caliper/substance ratios (volume basis).

Construction Paper / Sugar Paper

Construction paper or sugar paper is a type of coarse colored paper typically available in large sheets. The texture is slightly rough, and the surface is unfinished. Due to the nature of the source material from which the paper is manufactured, small particles are visible on the paper's surface.

Cotton Paper

Cotton paper is made from 100% cotton fibers. Cotton paper is superior in both strength and durability to wood pulp-based papers, which may contain high concentration of acids. May also be known as cotton rag or ragged paper. Concentrations of Cotton fiber papers is known to last several hundred years without fading, discoloring, or deteriorating; so is often used for important documents such as the archival copies of dissertation or thesis. As a rule of thumb, each percentage point of cotton fiber, a user may expect one year of resisting deterioration by use (the handling to which paper may be subjected).(reference - Southwest Paper Co). Legal document paper typically may contain 25% cotton. Cotton paper is also used in banknotes.
Electronic Paper/ E- Paper

Electronic Paper is a display technology designed to mimic the appearance of ordinary ink on paper. Electronic paper reflects light like ordinary paper and is capable of holding text and images indefinitely without drawing electricity, while allowing the image to be changed later. E-paper can be crumpled or bent like traditional paper. Pixels on e-paper are image stable, or bitable, so that the state of each pixel can be maintained without a constant supply of power.

Inkjet Paper

Inkjet paper is paper designed for inkjet printers, typically classified by its weight, brightness and smoothness and sometimes by its capacity.

Photo Paper

Photo paper is a category of inkjet paper designed specifically for reproduction of photographs. The best of these papers, with suitable pigment-based ink systems, can match or exceed the image quality and longevity of traditional materials used for printing color photographs, such as Fuji Crystal Archive (for color prints from negatives) and Cibachrome / Il Fochrome (for color prints from positive transparencies). For printing monochrome photographs, traditional silver-based papers are widely felt to retain some advantage over inkjet prints.

Kraft Paper

Kraft paper is paper produced by the Kraft process from wood pulp. It is strong and relatively coarse. Kraft paper is usually a brown color but can be bleached to produce white paper. It is used for paper grocery bags, multiwall sacks, envelopes and other packaging.

Laid Paper

Laid paper is a type of paper having a ribbed texture imparted by the manufacturing process. Laid paper is still commonly used by artists as a support for charcoal drawings.
Tyvek / Tyvex

Tyvek is a brand of flash spun high-density polyethylene fibers, a synthetic material; the name is a registered trademark of the DuPont Company. The material is very strong; it is difficult to tear but can easily be cut with scissors or any other sharp object. Water vapor can pass through Tyvek, but not liquid water, so the material lends itself to a variety of applications: medical packaging, envelopes, car covers, air and water intrusion barriers (house wrap) under house siding, labels, wristbands, mycology, and graphics. Tyvek is sometimes erroneously referred to as Tyvex.

Paper Towel

A paper towel is a disposable product made of paper. It serves the same general purposes as conventional towels, such as drying hands, wiping windows and dusting. Because paper towels are disposable, they are often chosen to avoid the contamination of germs.

Wall Paper

Wallpaper is material which is used to cover and decorate the interior walls of homes, offices, and other buildings; it is one aspect of interior decoration. Wallpapers are usually sold in rolls and are put onto a wall using wallpaper paste. Wallpapers can come either plain so it can be painted or with patterned graphics. Wallpaper printing techniques include surface printing, gravure printing, silk screen-printing, and rotary printing. Wallpaper is also a term for computer wallpaper.

Washi

Washi or Wagami is a type of paper made in Japan. Washi is commonly made using fibers from the bark of the gampi tree, the mitsumata shrub (Edgeworthia papyrifera), or the paper mulberry, but also can be made using bamboo, hemp, rice, and wheat. Washi comes from wa meaning Japanese and shi meaning paper, and the term is used to describe paper made by hand in the traditional manner. Washi is generally tougher than ordinary paper made from wood pulp, and is used in many traditional arts.
Wax Paper

Wax paper (also called waxed paper) is a kind of paper that is made moisture proof through the application of wax. The practice of oiling parchment or paper in order to make it semi-translucent or moisture-proof goes back at least to medieval times. Thomas Edison claimed to have invented wax paper in 1872, but what he really invented was a cheap and efficient means to manufacture such paper. Wax paper is commonly used in cooking, for its non-stick properties, and wrapping food for storage, as it keeps water out or in. It is also used in arts and crafts.

Wove Paper

Wove paper is a writing paper with a uniform surface, not ribbed or watermarked.

Coated paper

Coated paper is paper which has been coated by an inorganic compound to impart certain qualities to the paper, including weight and surface gloss, smoothness or ink absorbency. Kaolinite is the compound most often used for coating papers used in commercial printing. One function of coating is to protect against ultraviolet radiation.

Indian Paper Manufacture Centers

With the rapid demand of writing materials the paper making centers were established in different parts of the country like in Sialkot (Punjab); Zafarabad in district Jaunpur (Oudh); Bihar Sharif in district Azimabad (Patna) and Arwal in district Gaya (Bihar); Murshidabad and Hooghly (Bengal); Ahmedabad, Khambat and Patan (Gujarat); and Aurangabad and Mysore in the south.

Out of these, the Punjab was the leading center. Sialkot paper was white in colour and very stout. It was used throughout Punjab. In Uttar Pradesh, Zafarabad is a famous town of district Jaunpur. It was known as Kaghdhi Shahar
(paper city) in olden times. It produced a very fine, glossy and strong variety of bamboo paper. Generally two varieties of paper were produced here, first was the polished paper, which was exceedingly glossy, and second was unpolished paper.

Bihar had two major papermaking centers in medieval times. First was Arwal town in district Gaya, and second was Bihar Sharif in district Azimabad (Patna). In Bengal, Murshidabad and Hooghly were the major papermaking centers in the medieval times. At a later period, Dinajpur also started manufacturing paper.

After some time, Gujarat developed as the largest producer of paper. It supplied paper to rest of India and also exported to the West, other Asian countries and Turkey also. In Gujarat, Ahmedabad was the largest papermaking center; it produced white and glossy paper.

During the Mughal period, Daulatabad, with Aurangabad as its capital, emerged as an important papermaking center. The most remarkable feature of Daulatabadi paper was its durability and glossiness. Daulatabad was the chief supply center of paper to south India.

Tipu Sultan developed papermaking centers in Mysore. The paper produced by Mysore, was a high quality paper, which was employed only for royal use. Other big paper making centers of medieval India were: Sanganer (in Jaipur, Rajasthan), Kotah (Rajasthan), Tijarah (in Alwar, Rajasthan), Kannauj (in Farrukhabad, Uttar Pradesh), Kalpi and Pukharayan in Kanpur (Uttar Pradesh), Maler-Kotlal (Punjab), Hariharganj(in district Shahabad, Bihar), Kalita (in district Pabna, now in Bangladesh), Panchanagar (in district Damoh, Madhya Pradesh), Dharangaon and Erandel town (in district East Khandesh, Maharashtra) and Poona.
Generally Indian papermaking centers produced glazed paper. Rahman has categorized ancient paper into seven categories: Kashmiri, Ahmedabadi, Hyderabadi, Faizabadi, Khasah-i-Jahangiri, Kanpuri and Aurangabadi.

Ahmedabadi paper was a little thick and was of two qualities: fine and superfine. The paper had extra whiteness and glossiness.

Kashmiri paper was stout and glazed. Some Kashmiri centers produced superfine paper called silken paper.

Khasah-i-Jahangiri paper was made at Sialkot. The paper was glossy, thin, polished and bluish white.

Hyderabadi paper was well glazed; some was polished and of brown colour with very fine shades.

Faizabadi paper had three varieties: i) unpolished paper (medium quality); ii) pale yellow; and iii) polished dark yellow.

Kanpuri paper was prepared from bamboo and was greyish in colour.

Aurangabadi paper was glossy and stout, had a few varieties like, Bahadur Khani (medium quality paper, thick, stout and durable), Sahib Khani paper (medium quality, thick), Murad Shahi paper (fine quality), Sharbati paper thick and fine), Qasim Begi paper (thick), Ruba-Kari paper (This variety was made in four or five different grades) and Balapuri paper (four or five varieties of different colours).

**Paper Production in India**

In 1925, Bamboo Paper Industry (Protection) Act and in 1931, Indian Finance (Supplementary and Extending) Act came into existence which provided the protection, and some more mills appeared on the scene. Rohtas Industries Ltd., Dalmianagar; Orient Paper Mills, Brajraj Nagar; Mysore Paper Mills Ltd., Bhadravati; Star Paper Mills Ltd., Saharanpur; and Sirpur Paper
Mills, Kagajnagar, Sirpur; were set up just before the outbreak of the Second World War. Indian paper Industry made remarkable progress during the war period.

In 1925, Punjab Paper Mills was started with an annual capacity of 6000 tons. By 1930-1931, the total capacity of paper production in India was increased to 45,600 tons as against 33,000 tons in 1925. The share of indigenous production in national consumption was now 71% as against 54% in 1925.

**Paper Industry research is conducted extensively in the following points:**

- Making the paper industry environment friendly
- Research conducted on processing raw materials
- Steps to improve the quality of raw materials
- Research carried out in efficiently managing energy.
- Research work pertaining to chemical recovery.
- Preparing stocks, coating and manufacturing paper areas are also attended to in research reports.
- Biotechnology applications in paper industry
- Research work is also carried out in areas related to bleaching processes and pulping processes.
- Paper industry research is conducted keeping in mind the following:
  - The prevailing conditions of the market
  - Effect of changes in demography
  - Market competition with regard to household paper products.

Statistics related to the usage of the different household paper products like towels made of paper, tissues, cups, plates, towels made of paper and all paper related products.

Research in areas related to retail market environment, industrial and commercial market is also taken into consideration.
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Top Paper Companies in India

The paper industry in India is one among the top 15 players in the global market, the industry offers an output of nearly six million tones, and the industry is working towards the objective of attaining a production capacity of 13 million tones by the end of the year 2020. Like any other industry, the paper industry in India is also dominated by a number of top players and the names of some of the top operators in this industry are given below:
Top players in the paper industry in India

✓ ITC PSPD
✓ Ballarpur Industries Limited
✓ JK Paper Limited
✓ Tamil Nadu Newsprint & Papers Limited
✓ Century Pulp & Paper
✓ The Andhra Pradesh Paper Mills Limited
✓ West Coast Paper Mills Limited

Some of the details regarding these top players in the paper industry in India are given below:

ITC PSPD

ITS PSPD is operating from its headquarters in the city of Secunderabad and they have their factories in different cities in India like Bollaram, Tribeni, Coimbatore and Bhadrachalam. Their branch offices are located at Ahmedabad, Bangalore, Chennai, Kolkata, Mumbai and New Delhi. They have introduced some of the products like DigiArt, Perma White, HiZine, Alfazap, etc... in the paper industry.

Ballarpur Industries Limited

This company has its headquarters in the city of Gurgaon and factories in the states of Maharashtra and Orissa. Their branch offices are located in the cities like New Delhi, Chennai, Mumbai and Kolkata. They have introduced some of the products like ten on ten copier, LWC paper, sack paper and maplitho NSD paper.

JK Paper Limited

JK Paper Limited is operating from their headquarters in the city of Delhi and they have their factories in the states of Gujarat and Orissa. Their branch offices are located in the cities of Chennai, Mumbai, Kolkata and New Delhi and some their products are Notepad, JK Printer blank, JK Pristine Cote,
JK IV Board, JK Endura and cedar branded copier was also introduced by them in the paper industry.

**Tamil Nadu Newsprint & Papers Limited**

The headquarters of this Public Sector undertaking is located in the city of Chennai and Tamil Nadu and their factory is located in the Karur District in Tamil Nadu. They have branch offices at Secunderabad, New Delhi, Nagpur, Mumbai, Kolkata, Ernakulam, Bangalore and Ahmedabad. Some of their products are AceMarvel, Perfect Copier, and Commander A4 size paper.

**Century Pulp & Paper**

Century Pulp & Paper Company is operating from its headquarters in the city of Mumbai in Maharashtra and factory in the state of Uttarkhand. They have branches at Kolkata and New Delhi and some of the products introduced by them are:

- ✔ Unbleached Absorbent Kraft
- ✔ Century Green, which is a copier paper made out of Recycled Fibre
- ✔ Century Elenza, which is a wood based paper
- ✔ Different grades of soft tissue papers

**The Andhra Pradesh Paper Mills Limited**

This company has its headquarters in the city of Secunderabad and factories at Rajahmundry and MR Palem. They have branch offices at Bangalore, Kochi, Chennai, Mumbai, Kolkata and New Delhi. Their product range includes Andhra Royal Silk, Andhra Primavera, Andhra Starwhite and Reflection.

**West Coast Paper Mills Limited**

West Coast Paper Mills is located in the city of Bangalore with its factory in Dandeli in the state of Karnataka. Their branch offices are located in cities like Chennai, Mumbai, Kolkata and New Delhi and they have introduced different copier papers and computer paper grades.
Most of these top companies in the paper industry make their contribution to the society by using eco-friendly production techniques and they also help the society by offering a wide range of employment opportunities in their factories and offices in different parts of the country.

**Paper in India**

The Chinese prisoners of war brought to Samarkand after the battle of Atlakh near Talas, first introduced (AD 751) the technique of papermaking from linen, flax or hemp rags based on methods used in China.

Ibn Nadim observed in Al-Fihristi: The Chinese write on Chinese paper made from a sort of herbage. This (industry) is a great source of income for the city. The Arabs learnt the technique of paper-making from the Chinese captives at Samarkand and diffused it westward. Al-Biruni also stated, The Chinese captives introduced it in Samarkand whence it diffused to other parts of the world.

After the paper technology reached the Arabs, the Arabians improved the technique and supplemented linen with flax and other vegetable fibres. With the conquest of Sind by the Arabs, Khurasani paper was first introduced in India early in the eighth century AD, and it continued to be imported for several centuries.

The reference to Indian paper suggests that the paper-making industry, however limited, had already been established in India, most probably in Delhi and Lahore, the two chief political and cultural seats of the Sultanate period.

In India, the first paper industry was developed in Kashmir, established by Sultan Zainul Abedin (Shahi Khan) of Kashmir in 1417-67 AD. Actually his father Sultan Sikander (c.1386-1410) was ruling over Kashmir at the time of Timur's invasion of India (AD 1398). Sultan Sikander sent an embassy, led by his son, Shahi Khan, to that formidable personage and sought his friendship.
Timur summoned him for a meeting but in the meanwhile political developments at home compelled him to leave India. He hastened to Samarkand but took along Shahi Khan and kept him virtually as a hostage until his death. Shahi Khan returned to Kashmir with many artisans and persons skilled in various trades with a view to introducing new industries there. These included paper-makers, bookbinders, harness-makers and midwives. The author of Tarikh-i-Kashmir stated the following about Shahi Khan, "During his stay at Samarkand he acquired knowledge. When he returned to Kashmir he brought with him a number of artisans skilled in different trades such as paper-makers, book-binders, carpet-makers, harness-makers and well trained midwives.

The quality of the Kashmiri paper was much in demand in the world and the rest of the country for writing manuscripts. According to Tarikh-i-Farishta, Sultan Abu Said sent fine Arab horses and strong camels of good breed as presents to Sultan Zainul Abedin. Pleased with this act of courtesy, Sultan Zainul Abedin in return, sent saffron, paper, musk, perfumes, rose-water, vinegar, elegant shawls, glass bowls and other fine products of Kashmir industry.

INDIAN PRINT INDUSTRY

Growth drivers:

- **Higher literacy levels**: In 2006, the literacy levels increased to 71.1% as compared to 69.9% in 2005.

- **Lower cover prices**: Earlier, due to strong hold over a region, the newspaper had higher cover charges. However, with increasing competition and venture into newer regions the companies have reduced the cover prices to augment more sales.
Higher ad spends: Print media accounts for 48% of the total ₹137.5 bn advertising spend in the country.

As per the registrar of newspapers, there were approximately 6,529 daily newspapers as of March 2005. No single newspaper had a national circulation. In 2006, India had the second largest circulation of newspapers with 88.9 m copies per day; second only to China with 98.7 m copies a day.

Predatory pricing (also known as destroyer pricing) is the practice of selling a product or service at a very low price, intending to drive competitors out of the market, or create barriers to entry for potential new competitors. If competitors or potential competitors cannot sustain equal or lower prices without losing money, they go out of business or choose not to enter the business. The predatory merchant then has fewer competitors or is even a de facto monopoly, and can then raise prices above what the market would otherwise bear.

Predatory Pricing in Newspaper Industry: Newspapers have no one to blame but themselves for the low cover prices. It is mainly a result of debilitating price wars between newspaper chains to push up circulation at the cost of their competitors. While the big fish have made short-term gains, many smaller publications have gone under.

The battle between Hindustan Times (HT) and The Times of India (ToI) for a larger share of Delhi readership almost reads like a business thriller. In 1991, ToI had a circulation of around 70,000 in Delhi against 350,000 for HT. To get ahead in the ₹1,000-crore Delhi market, ToI slashed its price from ₹2.30 to ₹1.50 in 1994, and by 1998 the strategy paid off. ToI cut into HT's readership, and the difference in circulation figures narrowed down to a few thousand copies.
It took HT just a year to undercut ToI’s price. On 19 March 1999, HT announced an ‘invitation price’ of Re 1 on weekdays. But this round ironically went to the ToI that emerged as the only national paper with a circulation of 1.7 million from being a one-city brand. HT, on the other hand, slipped. For the first time in its 76-year history, HT made an operating loss in the first quarter of 2000-01.

The company recuperated somewhat after Vir Sanghvi came aboard as editor, but the paper could never regain its number one position. By the end of 2007, ToI had clearly pulled ahead of HT by over 200,000 readers. The two behemoths are now stuck at a cover price of ₹2.50 and waiting for the other to blink first.

The HT-ToI scramble for market share has done long-term damage to the industry. Smaller dailies like the Pioneer and the Indian Express are like the living dead. The National Herald and several others closed down. It is no surprise that media revenues in China are eight times that of India, and the largest Indian media company is still to touch the $1-billion mark.

Demand function in Newspaper industry

The demand for newspapers is extremely price sensitive. In Mumbai TOI was way ahead of the competition. So it had a high cover Price (₹ 4) and didn’t push for greater sales, because that would increase their costs since cost of producing a newspaper is much greater than its market price. The new newspapers are priced much lower- HT ₹2.50 and DNS at ₹2 which boosted their initial sales.
In newspaper industry consumers is highly price sensitive as most of the news in all the newspapers is same. Journalists keep shifting from TOI to HT and back again. So the only choice reader have is in terms of Price.

Cost Function in Newspaper Industry

The spiraling increases in prices of imported newsprint, and the depreciating rupee, are forcing publishing houses to rethink their business strategy of keeping the cover price way below cost of production. The price of imported newsprint has increased by more than 60 per cent in the last year alone. The standard 45 grams per square meter (GSM) paper costs $950 per metric tones (MT) compared to $580 per MT in July last year and $380 in 2002. It must be remembered that newsprint accounts for close to 55 per cent of a newspaper’s cost and most companies’ import 40 per cent-65 per cent of their requirement.

This has taken its toll. Cavalier launches of business dailies in the regional languages have stopped. The Gujarati edition of Business Standard shut down within months of its launch in August this year, while the Hindi edition is tottering. The proposed Hindi business daily from the Network18-Jagran combine is yet to see the light of day after being delayed by nearly a year. Sakal Times, the general English daily from the Pune-based Sakal Group, wound up its Delhi edition even before it hit the stands.
K.U. Rao, CEO of Diligent Media that publishes the DNA, which has recently hiked its annual subscription rate, did not mince words. "We cannot subsidize newspaper costs anymore. Each copy costs us ₹13 to produce. It is the most subsidized commodity in the market today," he says. "Twenty years ago, the cost of milk was ₹2 a liter and a newspaper too cost the same. Today, milk has gone up to ₹30 a liter, but the newspaper is still ₹2."

MARGINAL REVENUE EQUALS MARGINAL COST

Cutting expenditure was the initial reaction of publishing houses to rising input costs. Most newspapers have reduced the number of pages. Hindustan Times has cut its business section by two pages; The Economic Times has cut back four pages. Most have either dropped some supplements or converted glazed newsprint supplements into ordinary newsprint products.

The apex body for news publications, the Indian Newspaper Society, has recommended a 30 per cent hike in advertising rates to make up the loss. The Rajan Raheja-promoted Outlook Group as well as the India Today chain responded by hiking ad rates, but by just 7-10 per cent.
But tightening of purse strings was not enough. Considered a booming industry till last year, news publishers have no option but to resort to tough measures to stay in the black. Some newspaper companies have decided to bell that cat — or raise the cover price. Hiking the cover price, seen to determine circulation numbers, and therefore advertising revenues, has hitherto been an anathema for most newspaper companies.

DNA has just hiked its annual subscription rate from ₹. 199 a year - or ₹.0.55 per copy - to ₹. 299 per year. The newspaper’s supplement ‘Me’ now has a price tag of ₹. 10 per month, taking the total subscription rate to as high as ₹. 419 per year or ₹. 1.15 per copy. The Times of India Mumbai edition too has increased its cover price from ₹. 4 to ₹. 4.50, which includes a free copy of the tabloid Mumbai Mirror or the Marathi daily Maharashtra Times. Increasing the cover price is an option being exercised the world over.

Going forward

A booming Indian economy, literate population on the rise, increasing consumerism, entry of global brands in the country and opening of the sector to foreign investors would drive the growth in print media. Also with newspaper companies entering into newer regions and segments would lead to stronger growth.
History of Journalism in India

While the printing press appeared in India as early as 1670, not until 1777 was the first newspaper printed in Bombay. These papers were operated by Parsi businessmen, and printed in English – several dozen existed by 1800. Papers in native languages appeared in the 1820s and 1830s; one example, Mumbai Samachar is still in publication today. By 1850 political newspapers like Rast Goftar began publication.

British colonialism contributed a tradition in freedom of the press, and ownership of many British newspapers was transferred to Indian business groups after independence. The country experienced an impressive growth after independence – in 1950 there were 214 daily newspapers and in 1990 that number had increased to 2,856. Today, India is a country rich with publications, with over 31,000 news titles published, including over 4,000 daily newspapers written in almost 100 languages. The largest newspaper in the country is the Times of India, published by Bennett, Coleman & Company.
ENDNOTES


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