1. **Significance of the study**

   One of the fundamental necessities of human life is clothing. Through it ranks second in the order of preference in basic needs of mankind—food, clothing and shelter, its special significance need not be overemphasized in a civilized modern society. The primitive men might have used this mainly to cover their body. But civilization and modernity calls for more than purpose. This has paved the way for all kinds of modern clothing. Eventually, it has opened up floodgates for a number of industries one way or other. These have contributed raw materials to textile industry. Indian textile industry is the forerunner of transformation from an agrarian economy to an industrial society. The predominance textile industry is manifested in its significant contribution of 14 per cent to industrial production, 4 per cent to gross
domestic product, 16 per cent to the total exports and 8 per cent of to central excise¹.

India has a large pool of skilled labour. In particular, textile industry has immense potential for employment generation. It provides direct employment to 38 millions and another 50 millions indirectly. It is reckoned that post quota regime would create 12 million additional job opportunities, which includes 5 million jobs in textile industry and 7 million jobs in allied sectors². Textile industry is the second largest provider of employment after agriculture. The structure of Indian textile industry is both complex and unique with hand-spun and hand-woven sectors at one end and modern capital-intensive sophisticated mill sector at the other end, with the decentralized powerloom and hosiery sectors coming in between. The industry has undergone significant changes in its profile over the last decade. In the last decade, in the production of cloth, the proportion of mill sector has declined while the share of powerloom and hosiery sectors has increased considerably. The primary reason is that the loomage capacity of organized mills has declined.

A study which analysed 53 countries for ranking, based on the growth rate, had ranked India number four in the growth potential category during 2002-03³. In another study, out of 104 countries, India ranked 29th in business competitiveness index, 37th in global competitiveness index and 55th in growth competitiveness index during 2004-05⁴. This shows India’s potential as an economic giant in the global market. Indian textile industry is being geared to face the quota-
free regime in the background of 3 per cent share in textiles and clothing in the international market, huge decentralized sector, low productivity, slow pace of technology upgradation and low unit value realization.

Paper-manufacture and book-printing are the beginning of knowledge revolution. In ancient India, the available writing materials were generally of two types viz. hard and soft. The former includes store, metal, sheets, earthenware etc. The latter consist of wooden board, dust, birch-bark, palm leaves, leather, cotton clothes and paper. The Indian pulp and paper industry is divided into three segments based on installed capacity and the use of raw materials in the production process. The paper industry is further divided broadly into two segments, namely, paper, paper-board and newsprint. Paper industry is one of the key and important industries of India. This industry is prominent for social, cultural, economic and educational development of the country. The industry had origin during 1812. Later, several mills were started in the country.

2. Statement of the problem

Economic and industrial growth is due to three important factors: Investment in capabilities, Productivity with which these capabilities are used and entrepreneurial ability. According to Karl Marx, it is the rate of profit and not the absolute level of profit that influences capital accumulation and investment in a country. The objective of maximizing the rate of profit is basically dependent on the productivity of capital stock. Improved technology has the effect of lowering the relative value
of capital stock and thereby raise productivity. The increase in the rate of profit acts as an incentive for entrepreneur to make technological innovations in production. A capable and efficient entrepreneur with increasing the rate of profit through adoption of improved techniques and methods of production stimulates economic growth. Profitability of investment in industrial sector is one of the possible reasons for economic growth. The increasing role of corporate sector in the economic growth of a country has attracted several academicians, researchers, administrators and professional institutions to conduct studies in different areas. One such area, in corporate sector, is profitability.

3. **Review of literature**

   An attempt is made in this section to review the existing available literature relating to cotton textile and paper industries in the country. This exercise is undertaken to know the research conducted on various aspects of these industries, identify the gaps in the current knowledge, priority areas and organize the present enquiry. In other words, it serves as a backdrop for the study and enables one to gain a greater insight into the subject. As such, it forms as a part of this study. This is divided into two sections. First section deals with cotton textile industry and the second one paper industry.

3.1 **Cotton textile industry**

   A description of past studies relating to cotton textile industry is presented in the following pages:
Mehta has examined the recent trends in the size of industrial units in seven selected industries of India viz, cotton, jute, sugar, iron and steel, coal, paper and cement. He found that the cost of production in small units is much greater and the morality rate in them is much higher than those of large units. Further he has observed that the trends in the size of units across the industries are uniform and consistent. Further more, concluded that various factors such as technical, organizational and locational differences, variations in the nature and characteristics of each industry etc. have either directly or indirectly influenced the size of industrial units in the country. Nag has observed that for an economy characterized by chronic shortage of capital, the significance of the fact that greater utilization of plant capacity would lead to a higher rate of profit and a lower capital output ratio provided its operating cost per unit of output rises less than proportionately. He is of the opinion that mill owners, labourers and the government are responsible for under-utilization of capacity in the textile industry. Mehta Suresh has stated that there is a scope for restructuring of textile industry provided the government modifies the fiscal policy such as excise duties, taxation and interest rates. Further, observed that restructuring of textile industry would depend on the fact that the government balances the differing interests of various sectors of the industry.

The South India Textile Research Association has pointed out that the textile exports have crossed the target in terms of volume and earnings. The study found that the cost of production of yarn in the
count range of 10-20 would be 5 per cent lower in the small sector as compared to organized sector. Besides, cotton fabrics are 25 per cent costlier than the mill made fabrics due to low productivity. Modi\textsuperscript{10} stated that the Indian textile industry is befuddled by outdated technology, rising raw material costs and shortage of funds for expansion/modernization. Another menace is the large scale smuggling of synthetic textiles and yam into country. These have assumed alarming proportions and proved to the detriment of the indigenous industry and the government exchequer.

Radhakrishnan\textsuperscript{11} concluded that the investment in textile at constant prices has increased at 9 per cent per annum till 1967 and later declined. This has reflected in slow rate of technical change in the industry. The author further pointed out that the index number of agricultural product prices had risen by 124 per cent during 1976-77 as against 100 per cent during 1956-66 whereas industrial prices advanced a little over 130 per cent. But the increase has not matched with an equivalent increase in the income of low income groups which constitute a vast majority of the country's population. This is reflected in the skewed pattern of textile consumption i.e. about 30 per cent of the population could offered for one metre of cloth only per annum, 40 per cent for nine metres and the remaining 29 metres. Shashikala\textsuperscript{12} has evaluated the working capital management in select spinning mills in Rayalaseema region and compared it between public and private sector units. The author studied the structure and sources of working capital. Further, assessed the problems of working capital from the
view point of management and suggested feasible ways and means to overcome the problems in the management of working capital. Venkatesu has examined the financial performance of cotton textile mills in India and Tamil Nadu. He has studied the origin, progress and prosperity of cotton textile mills in India in general and Tamil Nadu in particular. The issues studied were, management of funds impact of working capital on profitability performance and the overall performance of cotton textile mills. Discriminate analysis was used with the help of financial ratios to classify the cotton textile mills into ‘poor performers’ and ‘good performers’.

Indra Doraiswamy in her study on ‘Financial Performance – an Inter-firm Comparison” has analyzed the financial performance of 73 mills of South Indian Textile Research Association’ (SITRA) during the year 1965-1966. The inter relationship between profit, capital, productivity, raw material cost and selling price of yarn were studied. It also covered the influence of number of counts spun, inventory, age and size of mills on profit of count. The study found that raw material cost is not associated with profit and does not show any significant effect on the production per spindle and labour productivity. The profit per spindle and return does not show any appreciable difference between old mills and mills started during the period 1948-1954. Samuels and Smith in their study on Profits, variability of profits and firm size have analysed the relationship between profitability (profit after tax on net assets) and size of the firm (net assets). They found that profit and size are inversely related during 1954-1963. Indra
Doraiswamy, Ratnam and Rajamanickam in their study on 'Financial performance-An interfirm comparison' have analyzed the return on capital employed, production costs and the causes for variation in profits. Further, the influence of pattern of production on profit and the reasons for the fall in profit were also examined. The study found that the production patterns have a significant effect on the variation in profit. Labour cost and machine productivity have significantly influenced profit. The study suggested that the mills should ensure that the salaries and wages do not exceed 18 per cent of yarn price and machine productivity index not lower than 90.

Roger Cossaboom in his study 'Let's Reassess the profitability-Liquidity trade off' has opined that there is a relationship between profitability-liquidity trade-off. To reduce the firm's vulnerability to further liquidity squeeze, the firm should examine liquidity, flexibility, sensitivity, innovation and segmental financing. In addition, the author suggested that financial flexibility and innovation is the best approach for liquidity management. Indra Doraiswamy in her study on 'Financial performance-an interfirm comparison (5th survey) has analysed the financial performance of 85 mills of SITRA during 1961-70. The factors responsible for the variation in profit and the influence of pattern of production on profit were studied. During the study period, sales turnover, current assets, current liabilities and interest charges have doubled while fixed assets declined marginally. Chakraborty has made a study on the use of operating cycle concept for better management of working capital. The author evaluated the working
capital as a segment of capital employed. He has found that excessive working capital would lower capital turnover and bring down overall return on capital employed. The study has proved that though a very small working capital would yield an immediate higher return on capital employed, it would reduce the earning capacity of fixed capital employed.

Valliappan in his study 'Performance evaluation of management of finance in textile mills - a ratio analysis approach' evaluated the causes for variation in profit and the attributes for better financial performance of mills. Six mills were selected and the study period was 1964-70. Based on the return on capital employed, mills were divided into three groups such as high profit, average profit and low profit. The study concluded that the profit per spindle for the higher profit group (Rs.71) was almost 2 ½ times to that of the average profit group (Rs.28) and 5 times to that of lower profit group (Rs.15). The return on capital employed was 24 per cent, 15 per cent and 5 per cent respectively for the aforesaid groups. The study reported that high cost of production, non profitable trading on equity, lower volume of sales, lack of liquidity in working capital, over trading, over capitalization, high geared capital schedules, lack of protection for creditors funds, absence of long term financial planning and inadequate ploughing back of profits are the reasons for fluctuations in profit and poor performance of low-profit mills.

Smith concluded that the role of finance manager lies in achieving a trade off between liquidity and profitability in working
capital management. Indra Doraiswamy and Ranganathan in their sixth survey analysed the financial performance of 106 mills for the year 1974. They have evaluated the influence of labour cost, machine productivity, raw material cost pattern of production and selling price of yarn on the volatility of profit. The study arrived at that the mills with high capital do not attain a higher rate of production per spindle than mills with below-average capital. Barthwal in his study on 'The determinants of profitability in the Indian textile industry' has examined the factors which influence profitability. The variables used are: profitability, size of the firm, age of the firm, past growth, capital output ratio and changes in the average cost of production. Among them, past profitability and changes in the average cost of production were found to be significant determinants of profitability the other factors like capital output ratio, size and age of the firm and past growth influence less than 25 per cent of variation in profitability.

Rao had found that good mills managed their fixed assets efficiently, which is evident from the uniform rate of investment. Good mills held a lower percentage of current assets and high profitability while in others, it was erratic over 1962-71. He also asserted that the current ratio was low and indicated poor financial management. Chakraborty has conducted an investigation on debt-equity ratio with total assets, retained earnings, profitability and capital intensity. The author concluded that retained earnings and profitability were negatively correlated while total assets and capital intensity positively related to debt-equity ratio. Agarwal in his study entitled 'Size,
profitability and growth of some manufacturing industries' examined the relationship between profitability and size. The study was made for seven manufacturing industries during 1962-72. The author has pointed out that there is a relationship between size and profitability in cotton spinning jute, textile, sugar and brewing and aluminum industries, whereas no relationship in cement, cotton spinning and ginning industries.

Lambrix and Singhvi\textsuperscript{27} in their study pointed out that a firm can shorten the working capital cycle and improve the cash flow by reducing the time between receipt of raw materials and the paper work involved in it. The cash flow can also be increased by improving the terms on which a firm buys and sells goods and by improving the receipt or disbursement of cash. Gupta\textsuperscript{28} in a study entitled as 'Financial ratios as predicative indicators of sickness' has made a study on 41 Indian textile companies (20 sick and 21 non-sick) by using 63 ratios to predict the sickness. The author concluded that two ratios namely earnings before depreciation, interest and taxes/sales and operating cash flows to sales (PAT + Depreciation/sales) are significant. Rajamani\textsuperscript{29} has analysed liquidity, profitability, turnover, investment and structural position of textile mills in Tamil Nadu for a period of ten years from 1965-66. The study opined that the management with rare exception shows little concern for long term sources of finance. Further, opined that the cotton textile industry is a poorly paid sector as compared to sophisticated synthetic textile industry.
Bhave and Patel evaluated the cost and profitability of 24 textile processing companies during 1976-78. The study found that the return on capital employed was fairly satisfactory but return on equity inadequate. Further, among the elements of cost, direct materials ranked first (41%) followed by wages and salaries (18%) power and fuel (14%) etc. Besides, companies were found relying largely on borrowings for finance. Kulshrestha reported that excessive liquidity caused lower profitability and deterioration in managerial efficiency. Vishnu Kanda Purohit has evaluated the profitability of manufacturing industries in the corporate sector during 1950-51-1970-71. Variation in profitability has been computed with the help of co-efficient of variation. The author concluded that the profitability has moved upwards in most of industries over the study period.

Sarojini Rajkumar has analysed the problems encountered by Indian textiles in the export front. The author has arrived at that the share of cotton fibre production in the total fibre production has declined. Indra Doraiswamy has analysed the effect of boom and recession on 97 mills of SITRA for 5 years from 1977 to 1981. The study concluded that in the high profit group, 12 per cent of mills showed consistent increase in profits and the remaining showed varying degrees of profits. In the above average and below average groups, 50 per cent of mills showed varying degrees of profits. The study identified that some mills moved to high profit group due to gradual increase in sale value and steady decline in wages, power and interest. Modi et al have evaluated the financial performance of
cotton textile industry during 1962-81. They have examined the trend in the levels of fixed assets, current assets, sales, profit and return on capital in the spinning and composite mills. They emphasized the need for prior feasibility studies in sick textile mills for rehabilitation. Chalam and Chintha Rao in their study arrived at that the cotton textile sector could not generate adequate funds internally for financing or expanding its activities due to low profitability and fall in reserves and surplus. On the other hand, increase of reliance on trade dues and other current liabilities. Saihjpa studies the financial management of sick cotton textile mills in the northern region during 1975-84. The study reported that the capital structure was unbalanced and advocated skilful financial management for sick textile mills.

Ratnam et al. have examined the various items of cost and the factors that affect profit in spinning mills of the items of cost, raw material ranks first. Om Parkash and Sharma made an empirical analysis of India's export performance in the European Economic Community during 1974-85. The study reported that price competitiveness has significant relevance in the export front. The study has concluded that India lacks of competitiveness due to trade and industrial policy. Ratnam and Kalyanaraman have compared the financial performance of mills under SITRA. It was opined that a one per cent change in cotton cost will affect the cost of production by Rs.10 per spindle per yarn in 100s count and Rs.40 in 20s count. They have underlined the need for the use of superior cotton with improved
machinery to realize higher earnings. Further, stated that as the spindle speed increases, overall profit per spindle gradually rises.

Desai\textsuperscript{41} has made a comparative study on a few cotton mills in Ahmedabad in terms of their liquidity performance, their relationship with profitability, pattern of financing of current assets and the turnover of working capital. It was concluded that the liquidity and profitability are not influenced by size of the firm. Ratnam\textsuperscript{42} \textit{et al.} in their study arrived at the share of various items of conversion cost in sales and their effect on profit. The study had also critically examined the influence of profit on yarn selling price, machine utilization, spindle speed, spinning finer/coarser count. Rajamanickam and Chandramohan\textsuperscript{43} have brought out the need for higher productivity through investment and modernization as a means to ensure sustained profitability in spinning mills. The cost structure, cost control and sickness recovery measures were also studied. The study had pointed that the cost differences between the mills was due to variation in productivity. Further, the share of raw materials, salary and wages was dominant in the total cost of production. They have suggested measures to control the cost. Joseph\textsuperscript{44} \textit{et al.} in their study entitled 'An approach to Global Benchmarking for Indian spinning industry' focused on quality, production, raw material procurement, warehousing and distribution. The conclusions include to optimize the cost of production of yarn, each element of cost should be viewed separately and benchmarks determined; spinning; etc.
Revathy analysed the working capital structure of Weaver Co-operative Societies (WCS) in Erode district, Tamil Nadu. Powerloom Weavers Co-operative Societies (PWCs) and Handloom Weavers Co-operative Societies (HWCSs) are chosen for the study. The study covered five years from 1990-91. She found that the HWCSs are more dependent on external borrowings than PWCs. The profitability of HWCSs had been low. The working capital investment per metre production of cloth in HWCSs is nearly ten times to that of PWCs. Working capital requirement is relatively higher in HWCSs due to high cost of production, which is one and a half times of powerloom cloth. The correlation between production and working capital in PWCs is not as high as in HWCSs. Mansur A. Mulla had evaluated the financial stability and operational health of textile mills for a period of seven years. Altman's Z-score bankruptcy prediction model was used. It was found that the 'Z'-scores for textile mill were less than three during the entire period under study, revealing that its financial health was never in "too healthy zone". It was concluded that the textile mills under study are just on the verge of financial collapse.

Rajamanickam et al. have assessed 77 spinning mills for rehabilitation on the basis of financial and operational strengths and weaknesses. The study opined that 65 per cent of mills were severely affected due to low profitability. These mills faced capital shortage and accumulated losses. Shanmuganandam and Ratnam have analysed the financial performance of 140 spinning mills in Tamil Nadu during 1994-2000. They reported that the financial performance was poor.
Sankaran and Krishnaveni have studied the financial status of 30 non-SSI textile mills in Tamil Nadu during 1990-2000. The study identified the consistent and inconsistent performers based on their fund position and also analysed the long term and short term fund position. The debt-equity and current ratios were significant in best consistent units while insignificant in least consistent companies.

Cotton Textiles Export Promotion Council made a study on Benchmarking, production Cost of Textile Products; to identify the competitiveness of Indian textile products in export markets as compared to exports of products from select competing countries; and analyse the inherent reasons for competitive advantage or disadvantage. The study encompasses yarn, fabrics and made up segments of cotton textile industry. The study identifies the cost of raw materials, energy, dyes and chemicals and wages as the most critical cost in the cotton textile value chain. These constitute 85 per cent of manufacturing cost. It was reported that China is the cost leader with cost advantage in the factors of production and India is fast losing its traditional advantage of home-grown cotton, low cost labour and higher energy costs. The study recommends that India should target for radical cost of reduction atleast 15 per cent in spinning, weaving and processing, to regain its competitive edge. Jayaraj and Hango examined the determinants of textile exports from India during the period 1981-82 – 2001-02. The study concluded that trade openness was the greater factor than raw materials, power, obsolete machines,
technology upgradation and demand in determining the export potential of textile goods.

Sankaran in his study on ‘Identifying Discriminating Financial Factors between Well-Run and not Well-Run 30 spinning mills in Tamil Nadu’ has analysed the factors which separate well run from others for a period between 1991 and 2000. The SITRA has conducted a survey for 10 years i.e. 1997-2006. The impact of 55 variables on profitability was assessed. Shanmugam made a study on 160 mills. The inter mill variation in packing materials cost was analysed. In spinning mills, packing materials cost for meal 1.5-2.00 of sales turnover. The study recommended that the mills must exercise control over the packing material.

Krishna Moorthy has examined whether economic reforms have affected the state of industrial relations in the textile industry in Tamil Nadu. The author has studied the trend in the incidence of industrial disputes in the state in general and the textile industry in particular after the reforms process. Further, evaluated the functioning of the disputes settlement machinery in the state. The author has concluded that there is a gradual decline in the number of disputes and the number of workers involved in the disputes in the post-reforms period. But at the same time, the mandays lost due to strikes and lockouts show an increasing trend in the same period. With the measures taken by Government and labour department, the work load of adjudication machinery has decreased and the efficiency of conciliation machinery is reflected in discharging its functions. The
study has summed up that the economic reforms have improved industrial relations in textile industry in Tamil Nadu as there is a decline in the number of industrial disputes. The prevailing atmosphere of labour unrest could be attributed to total violation of certain norms of discipline by a section of trade unions and also by some employers.

Venkataswamy has studied the challenges faced by the Indian textile industry in the post 2004 scenario. He has noted that the global textile trade in the new economic order is not bound to be as smooth as it is made out to be by free-trade evangelists. He has stated that owing to the high intensity of completion, following the removal of trade barriers, hitherto assured markets could only be expected to crumble prices are set to decline for textile and clothing products as aggressive pricing policies of major retailers would set new bench marks and trigger a price war. Further, stated that the Indian textile industry needs new investments in the next five year to reach the ambitions targets. The author also studied other challenges like a new dynamics in the global textile trade especially in terms of partnerships, weak links in the textile value chain, high-power-costs, outdated-labour laws etc. Concluded that if India has to remain a competitive producer of textiles globally various labour issues and critical gaps within the economy need to be addressed on a priority basis.

Venkataraman has studied the effects of removal of quantitative restrictions or quotas on textiles and clothing on the Indian textile industry. The author has stated that capacity expansions, forward integration, pruning of costs and even acquisition of overseas
units in some cases etc frequently appeared in news. The author is of opinion that growing integrated facilities (operations spanning from spinning to garments) is expected to give players an edge over others, as they will be in a position to control cost, quality and supply of inputs and produce goods with shorter lead time. Importers are likely to prefer such vendors as they are more likely to deliver the goods promptly. The author has concluded that though the prospects of tall order, steep price declines, stringent standards and an inadequate infrastructure are enough to create worry lines on the foreheads of most exporters. The Indian textile industry may turn out to be one of the key gainers from the removal of quotas as India has the advantage of a low-cost-raw-material base and abundant, cheap labour, superiority in design and flexible in operations.

3.2 Paper Industry

The post studies relating to paper industry are discussed below.

Sharma and Singh58 have studied the paper industry and explained that the industry uses coarse or heavy and weight-losing materials like wood and timber in independent stages of production wherein a considerable loss of weight takes place in the first stage. It may usually seek different locations in different stages. Further, the authors found that the progress in the field of education, social services and industrial sector during the last few years has led to a steady increase in demand for paper in the country and production has lagged behind the demand. In addition, the authors have observed that the industry is facing numerous problems. But most of them can be
overcome by proper understanding and co-operation between the Government and the industry. Yasaswy has conducted a study on the working capital management in select public sector paper mills in India. The study has made use of both the primary and the secondary sources of data. The conclusions are: current ratio is unsatisfactory and far from the ideal standard; growth in current assets and sales in similar; there is a lag in average collection period, fluctuations exist in stock turnover ratio; negative working capital etc.

Satyanarayana Raju made an attempt to study the development of paper industry in A.P. The author concluded that the paper industry in A.P. is fairly and equally distributed in all the three regions of the state; credit squeeze has an adverse impact on the procurement of working capital; pollution arising on account of discharge of effluents is turning out to be formidable problem and threatened with dire consequences of even closure; there is a gradual depletion of forest-based raw materials viz. bamboo and hardwood; industrial relations scene is fairly smooth and peaceful; newly set up mills are face problem of non-availability of qualified and experienced technical experts to man their special equipment, plant and machinery to produce special varieties; cost of production is mounting up from year to year; major paper mills do not have any problem of competition but the mini paper mills are entering into the area of competition; and there is a remarkable diversification in the product line. The suggestions are that mills should be allowed to take up plantation programmes by entering into long-term leases of forest lands; there
should be close interaction between paper industry and farmers who resort to farm forestry as had been the case with sugar mills and cane growers in future; licences should be granted to integrated sugar and paper mills etc. Karmakar’s has focused on capacity utilization within the acceptable parameters. According to him, two types of costs i.e. direct and indirect- on the approach as well as in running the unit are incurred. The direct costs are being controlled from the beginning. Project monitoring system should be implemented efficiently at a single point towards this purpose. It is opined that due to a steep rise in the prices of raw materials, production cost has steadily increased and selling price remained unchanged. This has resulted in financial loss. Day to day cost audit at different points of time certainly give financial relief to the industry. Further, with the development in the refining technology, consumption of chemicals and chemical pulp and new combination of chemicals goes a long way to cover up the cost of cooking. To conserve energy, the author advocates that high capacity motors should be avoided and the motors should not run idle. Stock chest agitations should be provided with timer rehabilitation to existing capacity and make suitable modernization and expansion.

Rao has presented various issues relating to the development of paper industry in India. The author has examined the growth, structure and sectarian characteristics of paper industry during the planning era. The author has highlighted the problems of paper industry such as depletion of natural forests; concern for environment; necessity of unconventional raw materials; and outdated technology.
Various facets of government policy relating to licensing, fiscal incentives and statutory control on pricing and distribution are also highlighted. Sarvashri Goyal and Bharadwaj\textsuperscript{63} have analysed the causes for low productivity in small paper mills. It is concluded that 52 per cent of paper is produced by 275 small and medium paper mills with an average capacity utilization of 57 per cent. The authors have attributed that the use of obsolete technology, frequent power cuts and trippings, poor maintenance, non-availability of chemical recovery system, shortage of skilled manpower at various levels and non-adoption of pollution control devices are the causes for poor productivity and low capacity utilization in small and medium mills. Regarding possible remedies, the researchers have suggested adoption of latest modern technology; pollution control, to have a captive power plant to meet certain essential demands; and uninterrupted power supply. Also suggested training programmes relating to production techniques, equipment, stores, inventory control, and efficient utilization of wastes generated in the process.

Neelam Singh, Kachak and Malhotra\textsuperscript{64} have analysed the growth status, capacity utilization, production and demand pattern. The authors have opined that the large paper mills were subjected to shortage of raw materials and outdated technology. The authors have computed the total productivity and labour productivity in large and small paper mills. They have recommended the measures for the development of indigenous technology and adoption of foreign technology to suit the local raw materials i.e forest and non-forest. The
authors also suggested modernization of large old mills and revival of closed mills as the least cost alternative to maintain production capacity. Subba Rao\textsuperscript{85} is of the opinion that the small paper mills in India are surrounded by umpteen financial problems. These problems have to be sorted out immediately so that the small paper mills once again can be brought back to the right track. To facilitate the steady progress and prosperity of small paper mills, their finances should be managed effectively and efficiently. The mills should undertake necessary measures for resurrecting their financial viability. The excessive dependence of mills on external source, that too on borrowed funds, is suicidal. The finances of mills should be recognized suitably. To accomplish this task, either a part of borrowed funds should be repaid or be converted into equity. The shareholders in small paper mills are the worst sufferers. Internal generation of funds is tied up with profitability performance of mills. In financing expansion programmes, mills should use only equity capital instead of resorting to long term loans from financial institutions as the existing debts are already out of proportion. Small paper mills, though in many cases headed by technocrats, are unable to afford to hire in house R & D or establish sophisticated equipment in their mills. There is an urgent need to develop a technically feasible and economically viable chemical recovery system for small paper mills to prevent wastage of chemicals and to arrest widespread pollution. The overall profit performance of small paper mills is totally uncomfortable and it belied the hopes and expectations of stakeholders.
Balakrishnan in his study analysed the trends in pollution control and environmental management in pulp and paper mills and outlined the potential business opportunities for U.S firms offering environmental technologies, products and services in India. This study revealed that the industry was caught in a vicious down circle in 1997 that had rendered operations unviable. Most of the paper producers had reported substantial reduction in profits and in some cases, even losses. However, the per capita consumption of paper in India is one of the lowest in the world and is set to grow rapidly with anticipated growth in the economy. This study enumerated the major pollution control and environmental management problems faced by pulp and paper industry. The suggestions include: knowledgeable and reliable local contacts are necessary to identify growing opportunities and to navigate through complex bidding procedures especially in large scale, state-run pulp and paper mills. The most effective way to enter the market is to work jointly with an appropriate Indian firm through technical/marketing agreements. Such partnerships can be initially started on project basis, and later develop into regular joint ventures. This study concluded that most medium and long term finance is provided by a handful of development financial institutions. Further concluded that globalization and intertwining of Indian industry with overseas market increased due to liberalization. This in turn has resulted in non-expansion in pulp and paper industry, low capacity utilization etc. Chandrasekharan has explained the development of paper industry under various Five Year Plans in the country. The
The author has focused on locational pattern; demand and production; availability and quality of raw materials; infrastructural constraints such as power cuts; availability of coal and its price escalation; lack of transport facilities; and profitability of paper mills. The suggestions include: plantation programmes should be undertaken by companies, systematically either on their own or in collaboration with government to tackle raw material problem; steps should be taken for modernization and expansion of existing plants so as to improve quality of paper and paper products; cost effectiveness through energy saving and better control of critical items; and effective pollution control.

Seth dealt with the scope of using different agricultural residues, natural growing grass and non-wood crop fibres in the production of paper. The author made a plea that hand-made paper sector can perhaps use non-wood fibres in a big way. Availability of these materials in rural areas may go a long way to establish hand-made paper units in villages. Although hand made paper industry can take the benefit of existing technical know-how available, it would have to develop appropriate technology which may simplify the process and make it adoptable at the village level. This is because the chance of establishing large mills is remote due to non-availability of conventional raw materials, huge capital investment, long gestation period, increased costs etc. The author concluded that paper mills based on non-conventional raw materials have to be small enough and hand-made paper mills would perhaps be ideal. In this connection, the author discussed the use of begasse, sabai grass, kenaf jute sticks, waste
paper and rags, cotton and cotton linters. He also dealt with pulping process, washing, screening, cleaning, bleaching and stock preparation.

Ahuja\(^6\) in his pioneering work on ‘Paper Industry in India: Retrospect and Prospect’ presented a comprehensive picture of Indian paper industry. It deals with the historic evolution of paper industry in India. Somayajulu\(^7\) in his study entitled ‘Paper Industry in Andhra Pradesh – An Analysis of Behaviour of Costs’ has analysed the behaviour of costs, productivity and profits of paper mills. Also discussed the causes for low productivity and suggested remedies for it. A study\(^1\) on the problems and prospects of pulp and paper mills revealed that majority of pulp and paper mills are highly inefficient and contribute to large amount of atmospheric pollution.

In a paper entitled ‘Mini Paper Mills in Andhra Pradesh - An Overview’, Sanjeeva Reddy\(^2\) discussed the factors in favour of mini paper mills in A.P. Subramanian\(^3\) has analysed the consumption of cultural and industrial paper and paper board during 1980’s; forecast or predicted the demand upto 2000; and estimated the quantum of exports. The author concluded that the paper and paper board industry should utilize the existing capacity fully rather than on capacity creation. The author has recommended that small paper mills should be encouraged to expand capacity so that economics of scale in production can be realized. Jain\(^4\) examined the critical aspects of paper industry in terms of raw material needs and rise in the prices of inputs. Revivals of sick units, modernization, building up of new units
of economical size etc. are need of the hour. The author has underlined the need for proper planning for the supply of raw materials. Eswaran⁷⁸ has highlighted the problems of Indian paper and paper board industry. The author has analysed the impact of a meager increase in per capita consumption over production and domestic market. According to him paper industry presents a conflicting picture of a venture that has a good potential and least attractive to investors. Gosavi⁷⁸ gave an account of consumption and production of paper and paper board in the country. He made estimates of consumption, capacity and production of paper and paper board for the year 2015. The study opined that there is a good demand for paper due to urbanization, thrust of education and higher off-take by packaging section.

Krishna Mohan⁷⁷ in his study has evaluated the energy saving elements of paper industry and the scope for cogeneration. The author opined that conservation does not mean blind cutting down of consumption both physical and human resources. Venkateswarlu⁷⁸ has suggested an energizing and conservation formulae for the manufacture of printing and packaging paper. Rao⁷⁸ reviewed the pulp and paper industry in the changed scenario after globalization. According to him, the new industrial environment warrants the economy to operate under free market conditions. Bantia⁸⁰ in his article on 'Indian Pulp and Paper Industry: Pains and Pitfalls of Globalization' has narrated the advantage of better infrastructure facilities in international paper mills over domestic ones. The author further
stressed that the advanced process technology has always an edge over domestic industry.

Sharma\(^1\) in his book, 'The Indian Paper Industry at a Glance' underlined the need for modernization to increase production by minimizing losses due to break-down of machinery. It is suggested that better co-ordination between operating procedures and equipment is possible only by adequate process control systems, which in turn minimizes the overall energy usage while keeping the production at an economic level. The significance of research and development in paper industry was detailed by Mukundam\(^2\). Sarma\(^3\) dealt with the various elements of paper requirements and utilization. The study pointed out the new dimension to the demand for paper added by faster literacy drive and explosion in print media among several other variables. The study highlighted trend and determinants of paper trade against the framework of growth and performance of Indian paper industry. The author pleaded for upgradation of technology and management for the survival of the industry particularly in the wake of liberalization and globalization.

Ramesh Chander\(^4\) has evaluated the working and operations of hand-made paper units of Kurukshetra in the state of Haryana. The author has examined the start-up, history and growth of hand-paper mills. And also analysed the impact of development interventions on the economics of hand-made papers. Ramanaiah\(^5\) has presented an overview of paper industry in India vis-à-vis Andhra Pradesh and analysed its performance and related problems. The author has also
studied the financial performance of select paper units with the help of cost and break-even analysis. Sadhu has examined the small and medium paper mills, which are on profitable lines in the country. In another study, Sadhu has underlined the need for audit of waste, which would help to identify the sources, quantity, reuse and recycling and better disposal without affecting the environment.

Pasi Koivisto has evaluated the need for improved run ability to ensure quality production in time. This can be achieved through the combined effort of maintenance and production personnel with good equipment. Ananda Marcus in his study has elaborated wide-ranging programmes to improve organizational and operational results so as to reduce cost. Petteri Pihlajamaki and Hanu Hytonen have suggested business plans and strategies for forest-based business. These include valuation, information memoranda and due diligence studies, investor search, merger, acquisition, divestment, business restructuring and re-organisation, fibre strategies, forest management, wood supply, project preparation and implementation project monitoring and evaluation.

Sadhu worked out that the manpower cost in the production cost varies between 8 per cent and 16 per cent. The author advocated that it can be reduced with proper planning, up-gradation, modernization, automation and instrumentation. The author also presented capacity, production, demand and per capita consumption.

Gopalaratnam reported that the union budget has provided significant impetus for the growth of agriculture, infrastructure and healthcare which influences paper industry. The author is of the opinion
that the paper industry as a core sector does not gain commendable
benefits. Podder39 has examined the problems and growth prospects of
paper industry. The author has studied the investment pattern in big
and small paper mills. The author has observed that adequate
attention has not been paid for evolving appropriate technology for
paper industry. The author has opined that there is a bright future for
small sized units, which are best to the country. This is based on the
present socio-economic conditions and fibrous material, which is an
agricultural waste. Sentell34 is of the opinion that formation of teams
both laterally and vertically within organization and effective
communication system provides feedback and suggestions. These in
turn would produce outstanding results in quality improvement and cost
saving in pulp production.

Wictorian Tamaski35 asserted the necessity for and the methods
of energy conservation in the work place. Also underlined the need to
enrich management and service personnel in the new technological
process and their interactions in polish paper industry. Rao36 observed
that, in India, human resource is one of the first of its kind. It can be a
major strike weapon in globalization of paper industry. Indian
manpower can find its own level in terms of wages and job
opportunities in international markets. While pointing out the setbacks,
the author has mentioned that the investment in research and
development is poor and the human resource development institutions
suffer from lack of adequate funds. The author has suggested that a
new programme has to be planned for workers. The concluded that the

113
Indian paper industry is at crossroads. The challenges before it are many. The options require a strong motivation to face them. Development of a competent, dynamic and able human resource for paper industry requires immediate action. Today, the life of paper mill manager is full of demanding challenges. Managers should adopt flexible and adaptive style. In this regard, Sadhu pointed out that, for successful management, team must incorporate ingredients of a single structure non-bureaucratic behaviour, clear accountability and constant focus to achieve company goals. The author further stressed that the manager should be able to communicate with enthusiasm and dynamism. He should be a role model by his work and personal ethics. In another study, Sadhu dealt with the undergoing changes in paper industry in terms of technology, new business methods and new business requirements. The author is of the opinion that the industry can altogether turn the challenges into opportunities and make the industry sustain.

Need for the study

There are many studies concerning cotton textile and paper industries at the macro level. These were undertaken by individual researchers, research organizations, manufacturer's associations etc. The studies have focused on origin, location, size, structure, trend in growth, industrial relations, financial management practices, working capital management, sources of finance, production, income generation, profitability performance, capacity utilization, productivity, employment potential, human resources management, marketing,
technology, per capita availability, consumption, foreign exchange earnings, problems and prospects at the national, regional and area specific. A few studies are also organized at the micro/firm level covering the aforesaid aspects. The studies on optimal product mix in cotton textile spinning and paper mills are almost absent. There is no specific study on the maximization of profit contribution either at the all India level or A.P. level or firm level as far as the knowledge and understanding of the researcher is concerned. Therefore, a modest attempt is made in that direction at the plant level.

5. Present study

The performance of an enterprise in a competitive market would depend on the quality of decisions taken by its personnel. The quality of decisions depends upon the quality of data and information provided to decision makers. If the operations of an enterprise are not complex and the consequences of wrong decisions are not serious, it might be possible to make decisions based on experience and judgement but when operations are of a complex in nature and, in addition, uncertainties exist, basing decisions on judgement and experience might be expensive. In such a situation, operations research could be profitably used to provide meaningful data and information to decision makers. In most of the business enterprises, particularly in manufacturing organizations, input resources and production capacities are limited. These limited input resources and facilities should be utilized in the most economical way to produce the desired output at a lesser cost. Therefore, one of the many important decisions that have
to be made periodically in a manufacturing business is that of selecting a manufacturing plan to make the best use of existing facilities and which will also result in a profit for the business house.

The cotton textile and paper industries are the oldest and the largest industries of India. Normally, cotton textile and paper mills produce different types of products. The product mix in the Indian cotton textile and paper industries is affected by a variety of problems such as shortage of raw materials, high production cost, modernization, utilization of machines etc. In fact, several cotton textile and paper mills were closed in the country due to heavy losses during the last few decades. One of the causes for closure is low productivity. This is on account of non-adoption of optimal product mix, apart from several other causative factors. The mills can earn better profits by adopting optimal product mix. The present problem is to determine the best product mix for a month’s production in the sample mills. In this study, an attempt is made to decide which products are to be manufactured out of a list of potential products.

5.1 Objectives

The main objective of the present study is to analyse maximization of profit contribution in cotton textile and paper mills. The specific objectives are:

(i) to determine capacity utilization in various departments of select cotton and paper mills;

(ii) to compare capacity utilization in each department between public and private mills;
(iii) to determine optimal product mix for maximizing profit contribution;

(iv) to determine optimal solution for minimizing machine hour cost; and

(v) to investigate whether there can be any change in product mix if the amounts of available resources are changed.

5.2 Sample design and size

Cotton textile and paper industries are premier industries of India. Those are significant in terms of income generation, employment creation, foreign exchange earnings. There are cotton textile spinning and paper mills in A.P. Of the cotton textile spinning mills in A.P. one mill from each of private and public sectors is purposely drawn into the sample. Similarly, one paper mill from each of private and joint sectors is conveniently brought into the sample. The sample is limited to four mills due to time, resources and other constraints on the part of individual researcher.

5.3 Methodology and data collection

To achieve the aforesaid first two objectives, a work sampling analysis is carried out in order to find out effective machine capacities available in each department. Since each department does not work with cent per cent efficiency, a work sampling is carried out and utilization factors for all departments of both the categories of mills under investigation are evaluated. To achieve the next two objectives, a linear programming technique is employed. An optimum product mix is accomplished by constructing a linear objective function and linear
constraints representing the decision variables along with the profit contribution and processing time respectively and also the amount of scarce resources available. After solving the original problem, its dual was formulated so as to find out machine hour cost for all the departments. It is felt necessary to carry out post optimality analysis of the said problem in order to achieve the last objective.

The study has made use of both the primary and the secondary sources of data. The secondary information is collected from books, journals, magazines, periodicals, reports web sites, etc. The specific sources include official Directory and data base of the centre for monitoring Indian economy, namely, PROWESS, Annual Reports of the Southern India Mill Owners association (SIMA), annual reports of the Ministry of Textiles, Compendium of textile statistics, compendium of international textile statistics. The primary data is collected from the records of sample mills. The primary data is collected by administering a questionnaire specially designed for the purpose by personal interview method.

5.4 Tools of analysis

The data, thus, collected is processed, tabulated, analysed and interpreted with appropriate tools and techniques. These include ratios, percentages, simplex method etc.

5.5 Scope and limitations

The objective of the present study is to analyse the profitability of select cotton textile and paper mills in A.P. For a theoretical background of cotton textile and paper industries, the growth, structure
and performance of these industries are presented. The study examined the cost structure and profitability of sample mills. The study induces financial variables which influence profitability. The limitations inherent in the secondary data are bound to result in findings and conclusions. The sample companies did not follow uniform accounting practices. Despite all these, the results of the study are helpful and useful to management, creditors, employees, investors and policy-makers in making decisions in their own spheres of interest. The study is restricted to cotton textile and paper mills in A.P only. As there is no paper mill in public sector in A.P. one paper mill from joint sector has been drawn into the sample frame.

5.6 Chapter outline

The present investigation is organized into six chapters. The growth of cotton textile industry in India is examined in the first chapter. The progress of paper industry in the country is studied in second chapter. The third chapter deals with research design and methodology of the study including review of existing available literature relating to the topic of research. Working sampling techniques are given in the fourth chapter. The fifth chapter covers the profile of sample cotton textile spinning and paper mills. Analysis of maximization of profit contribution through the formulation of linear programming problem is presented in the sixth chapter. The summary of findings, suggestions and hints for further research in future are incorporated in the last chapter.
REFERENCES


