

Mini Paper Plants, An Objective Approach

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Introduction

What is a Mini Paper Plant, or for that matter a small Mill? The definition is not clear, and has been changed from time to time. For these discussions let us assume that any Paper Mill upto the capacity of twenty tonnes per day, is a Mini Paper Plant. This has been indirectly indicated by the "Paper (control of production) Order 1974" by Government, issued on 1st August, 1974. In this order vide clause 4 of the order, the Government has exempted those manufacturers, who produce less than 20 tonnes of Paper and Boards per day from the provisions of the said order.

According to the All India Small Paper Mills Association, there are over 40 small Paper Mills in the country and whose argument is for the above exemption for all the small Paper Mills, who do not have their own pulping units based on Bamboo or Hardwoods, and who do not have their own Chemical-Recovery Plants, irrespective of the production capacity of these units. According to the Association this classification has been accepted by Government in past for Small Paper Mills i.e. Mini Paper Plants. The

Mini Paper Plants, the name caught up after the Mini Steel Plants, have come up during last 2-3 years. Normally we have been calling them as small paper mills and still continue to do so in practice which will be followed in this article.

factors determining a Small Paper Mill, as per the Association, is not the Physical tonnage of production, but its very set up. In essence the primary factors for being called a small Paper Mill are:

- (1) It does not use primary raw materials like Bamboo or Hardwoods.
- (2) It does not have a chemical/heat recovery unit and power generating unit.
- (3) It depends basically on secondary raw materials such as waste paper, agricultural residues like straw, jute and textile waste.
- (4) It uses purchased Pulp from Primary raw materials.

The above definition is by and large acceptable, as the mills having a capacity of 30 to 40 tonnes per day are the results of gradual expansion of mills which were originally conceived as small mills in the beginning, keeping the same pattern of production and incorporating the above factors. Without going into details and controversies, let us assume for these discussions, that in general we are talking about the mills having upto 20

tonnes production per day and also the few 30 to 40 tonnes per day mills incorporating the above factors, which are definitely present in the mills below 20 tonnes mills and the 30 to 40 tonnes mills are the expanded units of Small Paper Mills.

For getting into the orbit of big paper mills the 30 to 40 tonnes mills should incorporate the above factors and then no one will call it as a small paper mill. Many examples can be given to substantiate the arguments, but it is not the object of these discussions. Hence we leave it here.

The Feasibility & Economic Analysis.

Mini Paper Plants are existing in India since last hundred years, and the Paper Industry started with Mini Paper Plants. When the bigger mills came up gradually and classification of small paper mills and big paper mills became distinct as two different groups, which also became a necessity for the sake of different economic and management approach on the part of the entrepre-

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neers for managing such units, and for the Government for different regulations and concessions to help the entrepreneurs, to make these small paper mills as economically viable units.

It was somewhere about 1958-59 Mr. V. Poddar the then Works Director of Rohtas Industries Ltd., and a well known figure in the industrial field advocated the necessity of establishing small paper mills as a requirement to increase the paper production, as paper industry being a capital intensive industry, big mills could not come up at faster rate to augment and supply the increasing paper requirements of the country. He also published a book "A Guide to Manufacture Paper on small Scale" in 1960 to help such entrepreneurs, giving all the technical and cost data, regarding 2 tonnes per day to 10 tonnes per day paper mill. He has given comprehensive details about the requirements of land, power, personnel and machinery etc. presenting these units, as economically viable and profitable propositions.

In spite of this advocacy by such a renowned man like Mr. Poddar, and the encouragement by the Government of India at that time by approving 60 schemes of small paper plants and granting licences to a number of them, the idea did not catch up with the prospective entrepreneurs, and we do not find any phenomenal or increased growth in the number of small paper mills in that period,

Another well known, and eminent

person in paper industry, Dr. R.L. Bhargava, in 1973 (ex-Chairman of H.P.C.) again advocated the economic necessity and viability of small paper mills in the range of 25 tonnes/day which can be self sufficient to use raw materials like agricultural residues and cotton-jute waste etc., which are abundantly available at a reasonable cost of Rs. 4 crores with indigenous know-how and plants. Four such plants accordingly to Dr. Bhargava will be more economical when compared with a single 100 tonnes unit, with the latter having its problems of raw and process materials procurement, transport and handling etc. This is as per his statement in Times of India, 12 February, 1973.

The pattern of growth of small paper mills does not appear to show any increase in growth directly related to the above advocacy of the viability of small paper units. The growth appears to have followed the natural economic development pattern of supply and demand of paper as well as money, any time, and for that matter all the times up till now. The growth showed a sudden increasing trend in 1973-74 when the inflation also started and Dr. Bhargava's statement came in the wake of this movement i.e., at the right time. The paper shortage, apparent or otherwise, started rising on the horizon with the rising paper prices as a result. We can say "as the boom came up, every one wanted to start a small paper

mill." About 168 licenses to Small Paper Mills were granted in this period, though finally only 22 schemes appeared to make any headway by the time recession started by November, 1974, and prices showed a progressive downward trend. Can we say the growth followed again the natural economic laws related to inflation followed by recession? One is tempted to establish the relation. But it cannot be definitely established and so many factors like Credit Squeeze, Fuel oil crisis etc. played their own part. As the enthusiasm of the entrepreneurs reached the peak in the end of 1973 and beginning of 1974, it tapered down very fast by later part of 1974, due to the factors mentioned above and real impact of inflation on machinery prices, though the paper prices were still high, indicating the Paper Industry as very profitable. In India with its basically agricultural nature, the position of availability of raw materials like agricultural residues is better for small units and transportation costs can be kept to minimum by establishing the units nearest to such areas where these raw materials are available.

The above proves that the growth in small paper units, is related to the industrial and general economic situation and pattern in the country, and cannot be directly attributed to the advocacy for the same by the Government or for that matter by any eminent personality in the industry. But still what they propaga-

ted remains true if visualised through a proper perspective, which is that small Paper Units have their own role to play in Indian Paper Industry and the Industrial scene of India. The factors existing in India, like the shortage of traditional raw materials like bamboo, and high capital investment required for big Paper Mills, make the growth of small Paper Mills an economic necessity because of its possibility based on locally available raw materials like straw, grass, baggasse, waste cotton, rags and waste paper to same extent (directly related to the economic rule of demand and supply of waste paper as it stands today). The complete technical know-how, lesser capital investment, availability of complete machinery indigenously and local employment, make a small paper mill an attractive proposition for small and middle class entrepreneurs. This also helps the decentralisation of Industry.

Due to the above factors the mini Paper Plant is and will remain a viable industrial enterprise at present and for quite some time to come. The matter is of proper economic and management approach, the objective approach to all the aspects of its establishment, control and management.

Two different groups:

The small paper mills and big paper mills, with their not so clear definition at present, have gradually fallen into two differentiating factors. The two groups became distinct, as problems and

necessities and other requirements of almost all the small paper mills showed evidence of similarity as different from those of bigger mills. Each group requiring different economic and management approaches. But sometimes one finds a tendency to mix the two approaches. But the problems, environmental, economical, legal and social, are very different for small paper mills vis-a-vis big paper mills. Hence the approaches have to be different.

As an evidence to this, the small paper mills association exists today in India as a common platform for the small paper mills to discuss their problems and as an institution to safeguard the interests of the small paper mills as distinct from those of big paper mills.

For the technicians and technical and management personnel also these are two different worlds. The technicians in small paper mills will generally appear to be moving i. e. changing jobs from one small paper mill to another small paper mill, and in many instances will not find it very comfortable to work in a big paper mill. The professional social circle of small paper mill technical personnel, by and large, will be different than that of big paper mill personnel. Similarly a person who has worked for a considerable time in big paper mills will, by and large find it somewhat not very comfortable many times, if he chooses to work in small mills, because of

the difference in the approaches, management and economic to various situations and problems, for the same reasons.

Project Planning :

"Keep The Cost To Minimum". This has to be the theme and watchword at every stage of planning and operating a small paper mill. This is necessary because of the comparative higher costs of basic raw materials and chemicals due to lack of chemical and heat recovery units in small paper mills resulting in higher production cost per tonne of paper related to these factors. Naturally all other costs have to be drastically cut down to bring the production costs per tonne of paper at par with those of big paper mills, and make the unit profitable and viable by assuring a reasonable profit margin for its profitable and economic survival. Power costs also are high in small paper mills as purchased power has to be used.

Obviously the project planning has to be done keeping all the above mentioned factors in mind. Let us do the classification of the possible entrepreneurs, taking into consideration the strategic inbuilt advantages each category has in the project planning.

1. If you are already in business connected with paper industry in the following capacities—
 - a) You are dealing with paper sales and have a

distributions agency for paper.

- b) You have already a conversion industry and are using paper and boards in your factory.
- c) You are a waste paper and other materials supplier to paper mills.

In the above cases, you are already in the business of your own, and connected with paper industry and the persons working in paper industry. You know a paper mill you have seen it, and are to some extent acquainted with it. You have already your existing establishment, accounting department and persons in your existing organisation to assist you in the initial stages of planning. In this situation you are in the most advantageous position to start a small paper mill.

2. If you have an industry other than paper industry, though you will not be so well placed of having more in built advantages, which the entrepreneur in the 1st category has, you have still the advantage of having the experience of running an industry with your own establishment and its people to help you initially.

(III) If you are a technocrat having technical knowledge and long experience of working in a managerial or other senior position in small mills, you are equally well placed as the entrepreneur in the second category, as you know in details about equipment, machinery,

process, technical know-how and management of small paper mills, to offset the advantages he has got of having already an established organisation. You will be able to do a proper selection of site, procure paper and cheaper equipment and its proper planning etc.

If you are a technocrat of similar experience but in bigger mills, you are better placed over the small mill technocrat in some respects and not in some respects, having an experience only in big mills. You have the around experience in all the factors of process and engineering technology as a technician in a big mill as compared to that of small mill. But you will have a definite handicap of having not been exposed to the different approach the small mill management has to take towards its all technical and management problems as an essentiality because of its very concept of being a small mill, you have to keep the above fact in mind and adopt a flexible approach.

(IV) If you have no background of the type as of all the above three categories, and the inbuilt strategic advantages which they have, you have no reason to get discouraged. After all you have the desire and determination to start a new small paper mill, which is common to all the above categories. Only precaution that you have to take is to tread the path cautiously, carefully and step by step, with the advice of proper technical people, solicitor

and a chartered accountant.

Assuming that you are now an entrepreneur belonging to any category as mentioned above, with its positive as well as deficit areas which are to be properly taken care of, you have to prepare a scheme followed by a project report, assuming that you have already studied and taken advice of proper people and found it possible and viable to be an entrepreneur of a small paper mill and determined to go ahead.

(A) Consultancy Organisations :

Besides the already established consultancy organisations, a few of them dealing directly in pulp and paper industry, there has been a spirit of consultancy organisations in recent past, big and small, keeping pace with the industrial development and its trends in the country.

It is many times found, that many big industrial undertakings have staff on their regular payroll, which is more qualified and experienced than the personnel in consultancy organisations only difference being that the personnel in consultancy organisations have more time, or for that matter all the time, for consultancy work as compared to the personnel in the industry, who have their regular work like production, maintenance and other work to do. This is the very argument based on which, the consultancy organisations try to sell and do sell their services to the big industrial undertakings.

To overcome this factor and recognising this point of their

inbuilt advantages and capacity, some of the big industrial organisations having a number of industrial undertakings, have started their own consultancy organisations to cater to their own needs and also for business by giving consultancy services to other organisations, who need them.

Being a small paper mill entrepreneur, you have to approach a consultancy organisation as your scheme and project report has to be certified by a recognised and registered consultant, if you want to get loans from Government and financial institutions. One cannot go into details in these decisions as to how to select a proper consultancy organisation or proper consultant to best and economic advantage for the entrepreneur. Many a enterprising entrepreneurs in some cases have managed it at very low cost or for that matter sometimes without any costs.

(B) The Site :

The proper site selection and required land acquisition, is the first and most important step. You can modify and replace the machinery in future but changing the site will be difficult. So the site should be selected with the long range objective in mind and future possible envisaged, and not at present envisaged expansion.

As such enough land should be acquired and not just enough for the present requirements. Land should be provided for present and future effluent treatment ponds which is the cheapest type

of effluent treatment, in the light of section 65 of the water (prevention and control of Pollution) Act, 1974 (Act No. 6 of 1974) regarding the waste water and industrial waste outlet. A part of the land can be used for the time being for agriculture and farming, by using the effluent as part of effluent disposal scheme and to augment your resources.

You should be as near to the nearest river as possible, keeping into view the future expansion and disposal of treated effluent, though your present water requirements may be fulfilled by digging one or two tube wells. Better be as near to the railway line and possibly near a railway station, as you can not afford to have your own siding.

It is needless to say that the site should be in the vicinity of the availability of raw materials, if they are mainly agricultural residues, possibly within 30 miles or so, to keep the transportation costs to minimum. The site though away many times from a big town, should be within a reasonable distance of 40-60 miles from a big town, having work-shop facilities, so that you can do away with a very small workshop of your own. Also the medical and schooling facilities in the town will be accessible to your staff and workers, which you cannot afford to provide them, at least for the time being, but nevertheless, they are important. Also you will have additional

advantage, if the site is as near as possible to the consumption centres, for your products, while fulfilling the above perquisites.

C. Equipment Selection and Layout Planning :

The selection, specifications and layout of the equipment has to be such, that costs are kept to the minimum, and for simplified and streamlined operation, so as to enable you to keep down the manpower costs to minimum and easier and faster training for some of your inexperienced operating crew. The layout and equipments should have inbuilt possibilities for subsequent modifications, alterations and expansions to enable you to keep pace with the fluctuating demand of various paper and boards and to take the advantages of varying economic availability of various basic raw materials.

The equipment should have the maximum possible flexibility regarding the use of basic raw materials and for making various types and ranges of paper or for that matter paper and boards. This will enable the undertaking, as mentioned above, to take the maximum possible advantage of economic availability of different raw materials at different times or the profitable combination of the same at any time, and to meet profitably the varying market demand for different qualities of paper and boards from time to time. This can be achieved reasonably at minimum

costs but the details about the same cannot be covered in the scope of these discussions.

Please plan a simple and proper layout, keeping sufficient margin for future expansions and with a view to keep the travel of different raw materials in various stages of process and the pulp and paper stock in the process, to minimum distance, for cutting down piping and power costs, and also handling costs. It is needless to say that this can be easily achieved by proper planning in the initial stage.

D. Buildings :

The modern technical trend is towards keeping the buildings to minimum, in all the mills as far as possible, keeping of course in view, the local rainfall, earthquake factor etc. The buildings should be minimum and basically to support and protect the equipments and this is the principle followed now even in big mills. Small mills must follow this, to cut down the costs in the project capital. But sometimes one finds the situation otherwise in practice. While the new big mills are having minimum and as far as possible open buildings, many small mills are having fully closed and spacious buildings in many cases. Excepting the proper protection for essential equipment and for the equipment that deserves it, one should have open buildings and roof and side walls of cheaper construction. This is a must for a small mill.

You can always add walls and

additional buildings and offices etc. afterwards as you generate money. Initially the word of caution will be "cut down on the offices and fully covered buildings and pucca ware-houses and their area to the minimum possible". You can always add these afterwards.

E. Manpower Planning and Man-Management :

Out of four basic tools of Managing any enterprise i. e. Men, Machines, Materials and Management, the men is the most important factor i.e. Man-Management. The small mill has to give a special importance to this factor. To cut down costs it has to keep the Manpower to minimum and cannot afford to hire high salaried personnel. At the same time any substantial percentage of personnel turnover, which is quite common in big and small organisations at some periods, (when a new mill starts and recruits people in large numbers from running mills) can result in upsetting the small mills operation to a great extent, while it will have minimum effect on a big mill.

In a small mill the entrepreneur has to take direct interest in running the mill and almost run the day to day operations. You will have to become a technical man if you were not the same before. You will have to work almost as a General Manager if you want to make the enterprise successful and profitable, at least, in the gestation period, till the

mill becomes stable and a viable enterprise. Of course, this you can do, only when you have no other business to attend. In that case you have to select a proper person to manage the mill under your supervision.

A minimum number of well experienced key personnel and rest fresh young matriculate boys and few graduates from the local community and nearest village and town, to be trained in the mill itself, will not only keep your man power costs to minimum but reduce the personnel turnover, in addition to improving your public image in the area, where your mill is located, with the improved public relations.

The family type of management based on the Japanese system appears to be a key to tackle this feature what is called a "Feudal Management" in the Scientific Management Jargon, may be a subject of frequent criticism in big organisations, but it appears to be a "must" in small paper mills or for that matter, in any small industry, to make it a profitable success i.e. the "Paternal Management" a modified form of "Feudal Management" which is actually practiced in Japan. In Japan the whole family runs a small industry where the husband, wife and sons work. The unit is run as a family activity. The paternal type of Management philosophy, properly practiced, represents, to be the backbone of the industrial revolution in Japan.

The system gives the organisation a team spirit, sense of belonging to and pride in the organisation, and job security for the people who serve there, and minimum turnover of the personnel, which is bound to reduce the higher personnel costs to the organisation in hiring new technicians at higher salaries and their unproductive period till they get well acquainted with the mill, in the case of high personnel turnover.

Another eminent and well known Technocrat turned successful industrialist in Indian Paper Industry Mr. M.S. Parkhe, who also advocated the necessity and economic feasibility of small paper mills, years back and proved it to be a successful adventure by establishing a small paper mill himself, is a successful exponent and advocat: of Japanese system of Man-Management in the Indian industrial context. He has not only advocated it, but practiced it most successfully.

He has also achieved a great feat of success by running a small paper mill with the objective approach, of making it a viable and profitable undertaking as required for a small mill, while at the same time running a big mill at another location with the objective approach required for running a bigger mill. The two approaches are different from one another as required, because of the different sizes of the undertakings and the word "objective" in the objective approach implies

this difference. Hence the objective approach.

(D) Operational Management :

As mentioned already, the small paper mill requires a more dynamic and flexible i.e. adoptive approach to its various problems at different phases of planning and operation. This is more necessary for a small paper mill, to keep in trend with the economic developments, fluctuations in the economic availability of different basic raw materials and chemicals, and the varying demands for different varieties of paper and boards, to enable the undertaking to make full use of these changing factors for profitable survival. A rigid approach is likely to lead to a setback, under these fluctuating situations.

The mill should adopt simple manufacturing techniques and should have inbuilt adjustability in its equipments and layout, to enable it to meet the demand pattern for finished products and to exploit the economic availability of raw materials from time to time, to the fullest profitable advantage of the mill. In a small mill the traditional pyramid type of organisational structure will not give the desired results. The concentric circles type of organisational structure centering around the entrepreneur appears to be a suitable answer. Often in a small mill, one person will have to look after 2-3 or even more departments or functional areas, and this is very possible and desirable in a small

paper mill, to cut down the costs, with better efficiency and co-ordination of work. The areas of responsibilities cannot be strictly demarcated and should not be, in a small mill.

F. The Actual Scene :

What one observes in many existing small paper mills in the country in actual practice is really very interesting and thought provoking.

1. Location :

One will find many small units located in congested areas far away from railheads and river, operating without having given any thought to future expansion or diversification for necessary economic and profitable survival. When the paper boom came in 1973-74 and these mills wanted to diversify their activities and expand, they were obviously handicapped.

Some units in this period took the advantage of the situation by using cheaply available waste paper and making news-print or which-ever paper was in short supply, out of the equipment which was basically not planned for waste-paper utilisation. Location of number of paper mills will be found defective in the present context of the industry, though it looked alright at the time of inception, because of the lack of long range objective planning and proper perspective.

2. Equipment :

In a number of mills one finds varieties of equipments for the same purpose, right from the standard and sophisticated equipments imported or indigenous, to the equipments, fabricated locally by some comparatively unknown engineer or a fitter. In one extreme case in one mill the spherical digester was fabricated by the local ironsmith.

One often finds the right equipment located at wrong places, equipment existing, but not being used because of some apparently irremovable bottlenecks, which are really removable. This appears to be mainly due to the lack of proper and allrounded technical personnel or technical advice which, the small mills in most cases cannot afford to pay for. It will be advisable for such mills to invite senior technical people from paper industry for short visits to their mills and get their advice from time to time as required. That is why the extreme care the small mills should take in selecting a proper technical person with varied and wide background to head their technical side, as they cannot afford to employ a number of senior technical personas as big mills can do to cover all the departments of engineering and production technology.

One will find all types of machinery even drying cylinders made locally or made by the use of secondhand drying cylinders from

jute mills: In one mill the drying cylinders are locally fabricated with mild steel and with dished ends.

Some engineering complexes have come into existence as a natural corollary to the industrial development in the country, to cater to the needs of these small paper mills in addition to the well known and established paper and pulp machinery suppliers. One such complex has developed around Ahmedabad area in Gujarat. The other one is around Coimbatore-Vijaywada area and third in Punjab area. These complexes have developed in co-operation with the small mills in respective surrounding areas, to cater to the equipment needs of these mills at comparatively cheaper costs, to the mutual benefit. One can say that Bombay area has also the capacity to cater to these needs. But the Punjab and Bombay engineering complexes could not develop to the extent as the other two areas, due to the lack of enough demand on them.

One can find these engineering complexes supplying each end all types of equipments, right upto the fourdrinier paper machines, with the necessary guidance and help from the mills technicians.

One will find most of the mills making their own pumps and even valves. Two to three types and capacities of pumps are made and used for various types of liquids and pulps and paper

stocks, irrespective of the requirements of required head and other specifications. This results in many times in increased power consumptions but indirectly introduces the standardization of equipment in the mills, resulting in lower maintenance costs which may be to some extent off-setting the higher power costs.

One will find good equipment just lying idle, like Johnson's vibrating screens, deflakers, consistency regulators, centrifugal screens etc. which could not be put into the operation but could definitely be put into operation with little modifications by a knowledgeable technician.

One finds two mills in the same area using the same process for depithing of bagasse and removing 8% pith in one mill while 25% pith in the other mill, both mills claiming the same yield of pulp and both seem to be happy over their results.

In the case of boiler operation, specially oil fired, many variations of operation are found, one mill raises the pressure to 120 lbs/sq. inch in a 180 lbs/sq. inch pressure designed boiler and then stops the firing till the pressure drops down to 60 lbs/sq. inch, its process pressure need being only 45 lbs. while the other mill having a similar boiler only operates it at 150 lbs. though having a pressure reducing valve, for reducing the pressure to 80 lbs/sq. inch i.e. the Process steam pressure required and boiler

designed for 180 lbs/sq. inch. pressure. In one mill, the coal fired boiler converted to oil fired with 2 oil burners to cover the wide hearth, operates each burner alternatively as its requirements are less than the generating capacity. The operational short fall in the above instances are clear and there appear to be a number of cases like this.

In a number of smaller mills secondhand boilers of higher pressure rating are installed than the steam pressure requirements on which they are operated with the obvious implications as mentioned above.

In some cases one finds refiners placed after every stage of cleaning of waste paper stock, right after the hydropulper and sand traps installed, just before the head box of paper machine. While the cleaning equipment is very necessary for the mills using rice straw and other agricultural residues, one may get perplexed to see the layout and location of this important equipment in some small paper mills.

One finds various types of cooking equipment used for straw in different paper mills, like the standard spherical rotary digestors, tumbling digestors to open vessels like pulpers in which the straw is cooked. Bagasse cooked for 2 hours at low pressure with less alkali in open concrete vats, and the process being called cold soda cooking. Hardwood chips being cooked in standard rotary spherical digestors tested to 150 lbs/sq. inch at 120 lbs/sq. inch, with obvious implied complications in future.

One mill bleaching wood pulp to 74 degree brightness in single hypochlorite stage, while the other mill having a 3 stage bleaching plant with chlorination, caustic extraction and hypostage for bleaching rice straw pulp to the same brightness. Many more instances could be given like this. One also finds a Ten tonnes per day paper mill with project cost of Rs. 1 crore, while other managing the same capacity mill in Rs. 70 lakhs or even less. A 15 tonnes per day board mill project cost quoted as Rs. 75 lakhs by one

established machinery supplier, while the same project cost quoted as Rs. 30 lakhs by another machinery supplier and board mills supplied by both of them operating successfully in practice.

One invariably finds the boiler feed water treatment plants in many small mills either lying idle or defectively operated. The paper machine condensate is found in some mills collected in open or partly covered concrete tanks, open to the dirt and atmosphere before being pumped to the boiler. In some mills there are no facilities for testing the water and what type of water goes to the boiler is difficult to find out, while most of the times the operator is keeping raw water open into the boiler feed water tank.

Many more instances could be given like this. But one also feels happy to find out some small mills really being operated, the way they should, to the advantage of the undertaking and some of them can be called as ideal units.