Chapter-I

Introduction
Industrialization has come to be regarded as synonymous with economic development it is of course true that the available empirical evidence makes us believe the thesis that no country could have developed and reached its current state of economic development without an easy access to a sound agricultural base. Those countries, which had underdeveloped in agricultural sector, could afford to make use of agricultural resources in some other dependant countries: in all other countries, agriculture served as the "leading sector" of growth. But it is also true at the same time that fast economic development everywhere has been made possible essentially due to rapid industrialization. There is hardly any country in the world (with the possible exception of New Zealand) that could reach the level of per capita income of industrially developed countries of the west, drawing mainly upon its agriculture and processing its products. As a matter of fact, the essential criteria that are being used to distinguish a developed economy from an underdeveloped one relate to the proportion of workforce engaged in industrial activity, the proportion of national output originating in the industrial sector etc., No wonder that not much distinction between the two terms Industrialization and Economic development and that are used interchangeably. "It is realized that industrialization offers substantial dynamic benefits, that are important for changing the traditional structure of the developing economy. Industrialization is advocated for primary products producing and exporting countries because they are confronted with lagging export demand while they have to provide employment for rapidly increasing labor force."

Kindle Berger lays down the following reasons for industrialization in less developed countries like India, according to him four points being are highlighted for industrialization. Firstly: Developed countries have industry therefore the way to become developed is to industrialize. Secondly: The marginal value product of labor is higher in industry than in agriculture, hence to transfer of workers from agriculture to industry raises national output.

Thirdly: Industrialization has therefore it is better than stimulation of agriculture. external economies where as agriculture has not. Rural society tends to stagnant urban society dynamic. Industrialization brings urbanization. The Transfer of employees from agriculture to industry in such countries results in adding production by them in industry, which is better than none on the form. The same is holds good in developing countries also where the agriculture sector is suffering from disguised unemployment. Fourthly: The improvement of agriculture mainly depends upon the availability of manufactured inputs such as fertilizer and farm machinery. In order to increase in efficiency in the farm one must start in the industry. "Most of the western economists tend to identify agriculture with underdevelopment and industry with development. This is on the account of the fact that most of the developing countries are heavily dependant on agriculture while most of the developed countries are highly industrialized. The economic history of most of the nations also shows that with economic development of a country, the share of agriculture in the national income declines while the share of the industrial sector increases. Therefore, industrialization is taken as concomitant of development and many economists argues that if an underdeveloped country is serious about its economic development it must initiate programs of industrialization. From the literature we can observe that "Vicious Circles of Poverty" are at work in under developed countries like India, which retard economic development. The vicious circles operate both on the supply side and the demand side. In order to break the vicious circles it is advocated that "more or less synchronized application of capital to a wide range of different industries". Synchronized use of capital to a wide range of projects in different industries may raise the general level of economic efficiency and enlarge the size of the market. A frontal attack of this sort a wave of capital investments in a number of different industries has been called by Nurske's balanced growth, the case for "balanced growth" rest on the need for a "balanced diet". There is a valid and strong reason for a vigorous policy of industrialization in underdeveloped countries. The colonel rule in underdeveloped countries resulted in building up economic enclaves related to their balanced economies and determination to change this situation.

These countries have a very high foreign trade ratio, in relation to their national product or income. This high foreign trade orientation is not only a healthy sign of their vigorously exploiting the economic advantage of an international division of labor. It is rather one of the indicating of their underdeveloped status. The craving for industrialization by the developing countries is to remove the imbalances inherited by the developing countries from the colonel rule as well as economic dependence. Also, the disequilibrium existing in underdeveloped countries destroys the basic demise underlying the status of the international division of labor. Hence, the fundamental significance of the industrialization of the new countries is not an end in itself, but the principal means at the disposal of these countries of obtaining a share of the benefits of technical progress and of progressively raising the standard of living of the workers. Manufacturing industry represents a higher stage of production. In advanced countries the development of manufactured industry has been concomitant with these countries, Spectacular economic progress and raise in the standard living.

In countries with ratio of population natural resources and in particular, to land, manufacturing industry represents virtually the only hope greatly increasing labor productivity and raising levels of living, however much is done to improve agriculture. Industrialization creates a technology which can then be applied to agriculture, but not the vice versa. Industrialization projects viewed against the background of earlier economic dependence, take on the character of important symbols of national independence. “Thus the urge of underdeveloped countries for industrialization is compared not only of rational motives but also irrational and emotional impulses. Industrialization in underdeveloped countries should result in achieving “industrial revolutions” as in advanced countries which was concomitant with radical advances in agriculture and transport. Successful industrialization should not create a contempt for primary production on the other hand it should imply a substantial increase in the output of agricultural products and raw material for export.3”

1.1 Industrialization through Import Substitution:

The case for industrialization of developing countries is based on achieving import substitution. The success of import substitution helps a country in the production of goods, both consumer and manufacturing, in substitution for imports. Though the objectives of import substitution has in practice been industrialization and balance of payments, the policy has been rationalized by a number of protectionist arguments. The urge for industrialization in underdeveloped countries is based not only to overcome the natural inferiority of agriculture or supposed necessity of industrialization to achieve a rising level of income, but also an appeal to the experience of industrialized countries. Historical studies of some countries show not only that the share of industrial output raises with development, but also that the growth of industries based on import substitution accounts for a large proportion of the total rise in industry. In the case of some developing economies, it is found that they imported semi-finished materials and performed domestically the process of converting the finished industrial imports in to final products. Later on with the growth in demand for the final product, it created a necessity of investment for the production of intermediate components and basic goods at home.

The changes in factor-supply, especially the growth in capital stock per worker and the increase in education and skills of all kinds- were instrumental in causing systematic shift in comparative advantage as per capita income rose. “In the case of underdeveloped countries there is no reason to expect that a tariff on industrial imports would cause the supplies of capital, human skills, and natural resources to change in way that would favor the substitution of domestic production for imports. The changes in supply conditions that occurred in other countries can not now be duplicated simply by a policy of industrial protection.”4. Imports build demand in the domestic market. Increasing in imports are needed for the creation of an import-replacing industry.

Only after establishing the domestic industry the country can afford to dispense with the "creative role" played by imports. Then the country will have justification to apply protection. In addition to inadequate export earnings, the developing countries have the problem of low foreign capital and adverse terms of trade. In order to overcome the disadvantageous situation created by these factors. The developing countries should develop industries to substitute imports. Another important point of import substitution is justified to overcome balance of payments difficulties arising out of excess of imports over exports. Under such condition developing countries should reduce its imports and produce them at home. "The dangers on the foreign exchange front provide a reason for directing investments in industry towards production of commodities that are substitution for imports.5”.

1.2 Export Promotion and Import Substitution:

Export promotion and import substitution are the two important “growth strategies” in the process of development of developing countries. Export promotion consists in augmenting the existing exports and also diversifying exports by breaking new grounds under the impact of economic development. Diversification of exports involve achieving changes in the composition of exports and the direction of exports. It also envisages the objective of realizing higher earnings for exports. The need for high exports “an underdeveloped country has powerful reasons for maximizing the total value of its exports; for its ability to export will always be the main determinant of its capacity to import the capital goods which it needs in order to build up, interalia, its manufacturing industries.6”.


1.3 Is Industrialization the Key to Economic Development?:

Is industrialization is key to economic development? Is it logically or desirable in practice for all countries to become export manufacturing countries? Where as a less developed countries LDC’S regard industrialization as a central objective of their development policy. Industrialization as been criticized for their widening the gap between rich and the poor, and for increasing external costs such as those caused by pollution, however it would be unusual to find the government of an less developed countries LDC’S committing itself to a policy of no industrial growth at all. What is crucial is the kind of industry to be adopted, and the issue of whether industry can prosper without causing the decline of the country side. Thus it is seen that in the year 1960, percentage share of output in Most Developed Countries in the three sectors, agriculture, industry, and services were, 7.2, 40.2 and 52.6 percent respectively. However this has been transformed in to 2.9, 32.7, and 64.4 percent respectively in the year 1989. This shows how the sectors were transforming in to services sectors more rapidly. From the above discussion we can conclude industrialization is the basic engine for growth and dynamic benefits accrued from industrialization.

1.4 History of Industrialization in India:

Industrial evolution is natural process over a number of years. Socio-political factors conditioned by economic necessities weaved the industrial evolution into the present state. Like in all spheres of activity, the past when reviewed, will show the roots for the present, and an analytical study of the present will help to indicate the future trends. India had been, predominantly an agricultural country. The country was very prosperous during the earlier periods because of the then sound agricultural base of the economy. It was so rich that it had become eyesore and target for invasion. “The people are wealthy and prosperous, the town and villages are close together. The soil is rich and temperate and the manners of the people are pure and honest.” thus recorded a Chinese traveler Hiuen Thsiang. In the self contained economy of India, India was part and parcel of the Indian way of living. Because of fewer wants, and limited population concentrated on river basins well assisted by the nature, the requirements of the society were met by well built town-village industrial structure. This activity is more pronounced in the term “Craft” which
meant producing an article by indigenous talent to the local utility. When the quality of the article produced excelled comparatively the workmanship of the other parts of the country, the industry became well known and these crafts became saleable in the entire country and then abroad through the merchandising channels available then.

15 Indian Handicrafts:

"Evidence was gathered that metal handicrafts were existing during Rig Veda age. 8" This industry was flourished with the society meeting its segments. Artistic crafts must have also flourished as an art and were injected in to the texture of Indian way of life since the Vedic age these would bring the point home, that industry in India in the shape of the handicrafts was as old as the Indian civilization, and was nurtured by the craftsmen as part of their duty towards the society. Further, handicrafts reflects the synthesis or blending of the culture of all communities composing the Indian nation.

Perfection in art, durability beyond doubt and appeal to the eye of the individual were the qualities inherent in Indian handicrafts, that bought so much ever lasting for this illustrious country in the past. Indian fame that spread throughout the world, resulted in the expansion of foreign trade. Indian skill and master craftsmanship were exported and in return India used to get precious metals including gold into the country. The number of goods exported had also grown in varieties. They included jewels, perfumes, textiles, ivory goods and the like that were known to the civilized world. The royal patronage over these crafts had the important influence on the growth of the industry by artisans.

"7 Chinese accounts of India, Translated by Samuel Paul, Susilgupta (India) Ltd. 1958.pp. 303.7"

"8 R.V Rao. Indian Handicrafts. Book homes Private Hyderabad 1969.page.10.8"
The workshops called "Kharkhanas" came into being. The organization that brought the craftsmen in to the association was called "Crafts guild". In the kharkhanas different departments were maintained for different crafts, embroders, tailors, makers of brocades, gold smiths, turners, jointers, painters, etc., were all separately given spacious halls with all facilities and encouragement. From times immemorial till the eighteenth century India was "Queen of International Trade" with the help of the Indian handicrafts.

1.6 Decay of Indian Handicrafts:

The decay of Indian handicrafts has set in as early as the eighteenth century, the various causes responsible for the decay can be pointed out as, Firstly, The unfair attitude of the British Indian government towards these industries. Aspirations of the Britishers to use Indian economy as a market for their industrial products. Secondly, Imposition of heavy duties on the imports of Indian goods in to England, also, low priced British made goods, produced on large scale which reduced the competing capacity of products of Indian handicrafts. Thirdly, Development of transport in the country facilitating the easy flow of British products even to remote parts of the country. Fourthly, disappearance of the Indian royal courts, who patronized the crafts earlier. Fifthly, Change in the tastes and habits of the Indians, developing craziness for foreign products, and, lastly, Reluctance of the Indian craftsmen to adopt to the changing tastes and needs of the people.

1.7 Modern Industry in India:

It is interesting to note that the British endeavors through the East India Company, in India started with curing leaves in plantations, the manufacture of indigo, coffee, and tea plantations where the return on industrial capital was considered to be high in those days attracted the attention of the British. The first cotton mill in 1818 at Calcutta, the first tanning factory in 1845 at Madras and the first Jute mill at Serampur in 1852 were established and these industries flourished in subsequent years having a sizeable internal and foreign market. By the end of eighteenth century many factories were, spread over many parts of the country, manufacturing tea, coffee, cotton, jute, etc., as traditional items were set up. Mechanical inventions in Great Britain, the British Indian government policy and realization on the part of the entrepreneurs to establish modern
factories to produce goods on large scale to meet the changes in the tastes and habits of the people were some of the reasons for the evolution of modern industry in India.

Out of necessity, Indian industry had to geared up to the requirements of the Second World War. The allied nations of the war depended upon the Indian production as far as the Asian war requirements were concerned. Technological developments led to the setting up of new industries like Ferro-alloys, metal fabricating, mechanical and chemical industries. Production of transport and electrical equipments like diesel engines, pump sets, sewing machines, machine tools and cutting tools, basic chemicals and synthetic goods like plastics etc., had been taken up. The conditions in the years after the war were not encouraging, the disastrous effect of war, viz., over-production and over working of national capital equipment, inflationary trends, increased exploitation of the weaker sections of the society by richer influential persons etc., were not counter balanced by normalcy on production and distribution, it was because the rulers had no necessity of resetting the chaotic condition in India as they were engaged in doing so in their own country. The internal condition also did not favor resettlement of economy as the selfish rich class never wanted to risk their position in favor of the weak of the country. Indian economy was faced with reduced production and shortage of capital equipment and soaring prices. All the industries that boomed in war time went down to lowest production, while the country’s need was higher production of capital goods and consumer goods. Moreover, the entire country which was dissatisfied with the economic conditions had to concentrate on political means of getting independence.

1.9 Industrial Status: Post independence:

In the wake of independence India was faced with uphill task of overcoming the legacy of the colonel policies. Its problems of development was big and unique. The bigness of the task can be appreciated if we look at the miserably low standard of living and income obtainable in the country. It had slender industrial base. Millions of her people suffered under the weight of agrarian structure. Productivity in industry and agriculture stood at a low level because of backward technology in use. A
long period of economic stagnation had weakened the economy. There was an immediate need to raise the level of investment. The domestic savings required to raise the level of investment were altogether meager; superimposed upon these was the increasing population which clamored for its share in the economy, and had to be provided with the means of sustenance. While the domestic scene was non-too-bright, the resource availability of the external sector was even less rosy. Indian trade was struck in the age 'old structure. India traded in a few commodities and with a few selected countries, in particular with England. Prospects for a large inflow of private capital investment from abroad were dim. Thus, both the domestic and the external sector of the economy posed a serious challenge and made the task of development extremely difficult. The problem of development was also unique India had no parallel to draw upon. No other country as large and big as India had preceded her on the road to development. Not only is the size of the country of continental dimensions, but it had also to contend with about 400 million mouths to feed in 1951. Moreover, no other country as large and big as India had been subjected to such a long period of foreign domination. During this period of foreign rule Indian-economy stagnated. The British rulers were content to keep it as a “Colonel appendage” of the empire. The whole system of agriculture and industry was geared to meet the external needs of their own market. The British capital had entered primarily industry-oriented enterprise and “similar activities geared almost exclusively to the growing external trade with Britain”. Even investments in such domestic areas as metallurgical industry, foundries, and coal mines were essentially geared to railway expansion and hence to a vertical diversification process supporting export and import trade at the end of the line, there were “enclaves” of growth but the growth resulting from selective investments in these chosen enclaves failed to transmit the “spread effects” to the rest of the economy, her economic structure was typical of a “periphery” serving the needs of the “center”. Immediately after independence, India sought to reverse the “historical process”. “Given the nature of a highly fragmented and distorted economy received through a long period of colonel domination and low level of infrastructure, human resource development and living standards, in many parts of the country, the primary objective of economic and social policy has to be developmental”. This is recommended by the early pioneers of development economics such as Simon Kuznets, Rosenstain Rodan, Ragnar Nurnskee, Hans Singer and Arthur Lewis were nearly unanimous in recommending a leading role for the state in the development process; their work provided a power full intellectual case for central planning.
1.10 Industrial Scene at 1947:

On the eve of independence in 1947 the Indian industrial scene revealed the following broad features: Firstly by 1946, when the first census of manufacturing industries (CMI) was undertaken the industrial structure revealed the dominance of the following industries; sugar, vegetable oils, cotton, text tiles, jute, iron and steel smelting, rolling and general engineering. Between them these industries covered 83.71% of total value added and 85.57% of total employment estimated by the census. Secondly, If, however, we examine the changes in occupational structure, it is clear that, while industrialization proceeded vigorously through the period.

The impact of occupational structure was negligible. The share of agriculture in the work force between 1901 and 1951, as recorded by the census shows little change; and manufacturing even declined slightly from 1911 to 1931, to be restored to the 1901 level by 1951. On the other hand, regional statistics reveal that the share of manufacturing did go up in the states of, Kerala, Tamilnadu, Maharashtra, and West Bengal, while declining in Orissa and Rajasthan. Thirdly: The national income estimates show a clear trend in absolute terms. Over the period 1900-1947, per capita income also rose, from estimated rupees 52.2 to rupees 62.2; but this was an increment of barely 20% in nearly five decades again indicating a negligible impact on the overall growth of the economy. The share of the Secondary sector comprising mainly industries and mining in the national product was however to grow from 12.7% in 1900-1905 to nearly 17% by 1942-1947 reflecting the growth of industrialization and also a rising productivity in this sector. Fourthly: The lack of development of local technology and research establishments on any significant scale in the industries that were established by 1947 was matched by inadequate creation of opportunities for Indians to qualify for higher -skilled and executive jobs. Part of the problem was of course, the difficulty of getting Indians employed in foreign -controlled concerns at higher levels. But, even in indigenous concerns, Indians with technical skills were to grow in number in most cases unaided by government initiative in providing technical education or private industrial programs to train skilled, indigenous technicians. By 1947 the labor force in the modern factory sector amounted to over two million workers though this was only around 2% of the working population.
1.21 Industrial Development during Planning:

The relative backwardness of industrial development in India may judged from the fact that, the industrial output in 1948-49 accounted for only about 6.6% of the total national income and that the total labor force engaged was only about 2.4 million i.e., (1.8% of the working population) though the aggregate industrial output was very high, the per capita income was very low when compared with the other advanced countries. By keeping all these views in the mind Pandit Nehru laid the foundations of modern India his vision and determination have left a lasting impression on every facet of national endeavor since independence. It is due to his initiate that India now has strong industrial nation in the world. The goals and objectives set out for the nation by pandit Nehru on the eve of independence, namely, rapid agricultural and industrial development of our country, rapid expansion of opportunities for gainful employment, progressive reduction of social and economic disparities, removal of poverty and attainment of self reliance remains as valid today as at the time pandit Nehru first set them before the nation. Any industrial policy must contribute to the realization of these goals and objectives at an accelerated pace. As such heavy industrialization strategy incorporated in the Second Five Year Plan constituted a real structural break with the past. This strategy is based on the famous two sector model of P.C Mahalanobis, who formulated an industrial strategy, though independently, but similar to the model of Russian economist Fieldman, Mahalanobis model emphasizes the primary of capital goods sector for obtaining self reliant economic growth. Mahalanobis model maintains the view that the proportion of the total investment allocated to capital goods industries at each stage is the main strategic variable determining the long rate of growth. The model emphasizes that a higher rate of investment in heavy and basic industries would result in a smaller volume of output being available for consumption in the short run but, over a long period, it would result in a higher rate of growth of consumption in future. Besides in the model of mahalanobis, proportion of investment allocated to capital goods sector is independently determined on a consideration of long term growth rate, if level of productivity of capital in capital goods industries $B_k=0.2$ and initial rate of investment $Ao=7\%$, then Mahalanobis model arrived at the proportion of investment to be allocated to capital goods sector at $B_k$ at $1/3$ as appropriate under the condition prevailed during the beginning of the Second Five Year Plan. Summarily, three main aspects of the Mahalanobis strategies are, Firstly, developing a sound base for initiating the process of growth. Secondly, a high priority for
industrialization and Thirdly, emphasis on development of capital goods industries as against consumer goods industries. The term heavy industry refers to the network of structurally integrated activities, which include fuel, steel, electricity, transport, and machine building industries and infrastructure activities for the growth of capital goods industries together constitutes heavy industry sector. Assumption of the use of export earnings And foreign aid, Mahalanobis strategy aimed at achieving rapid industrialization through linkages both backward and forward. However, rapid industrialization depends upon the technological progress and its adoption. That is technology assumes a significant role in industrial development.

Technology is often identified with the knowledge about machines and process. In a broader sense it refers to body of “skills, knowledge, and procedures for making, using and doing useful things”. Technology thus includes methods used in non marketed activities as well as marketed ones. It includes the nature and specification of what is produced? The product design as well as how it is produced? It encompasses managerial and marketing techniques as well as techniques directly involved in production, technology even extended to services like, administration, education, banking and the law. The word “technology” comes from two Greek words: techne (the skill or craft needed to make something ) and loges ( discussion or knowledge of something ). So Technology means the knowledge of how something is made. An economist or a planner considers technology as a knowledge used in production, commercialization, and distribution of goods and services. The endogenous nature of technical progress may not be so evident, but here too a number of factors suggest that while the flow of inventions may well be autonomous the rate at which inventions are applied is a function of demand and output growth, we may found that most of the developed countries have lot of inventions for their credit. They applied their invention to machine building, iron and steel plants, telecommunications, electronics, and software etc., this shows the technological and scientific growth in those countries. Technology is generally a combination of hardware and software with relative proportions varying from one extreme to other. Hardware is any physical product, component or means, while software is the know-how, technique or procedure. Hardware technology is again can be of two types, namely: the end-use product type such as
automobiles, computers, television, and the production tool such as instruments, equipments and machinery. Software technology can also be considered as being of two types, namely: the “know-how” type technology such as processes, techniques, methods: and the “know-why” type technology such as knowledge, skills and experience.

From the above discussions it is worth noting that the country like India which is technologically backward can not cope up with the technologically advanced countries where in there will be continuous technology up gradation also the developed countries will invest 30 to 40 percent of their profits for their continuous research and development. India does not have any remarkable inventions for its credit and also she is not capable to adopt new technology as compared to technologically advanced countries. Because of this our country cannot cope up with technologically advanced country in international level, therefore “India has to depend on the imported technology that is foreign technology10”. To investigate the role of technology in industrial development one can also cite the example of Japan in addition to that of Western countries, before economic growth began to accelerate a century ago in this country, it was highly dependent on agriculture like other pre industrial societies, but there was from the outset a deliberate effort to acquire experience abroad, many Japanese went overseas to study industrial practice and the government set out to build new industries using foreign equipment and methods there was an outlook congenial to the importation of technology and continuous search for those areas where technology transfer had most often or would encounter least difficulty. But up to Seventh Five Year Plan India does not consolidate its position for imported technology or Joint Venture strategies even if it went, it will be for specific period, when the collaborator upgraded the technology, it can not catch up by home country.

“It is worth noting that almost all the countries took help from other countries to name a few, “It is use full to remember that every prosperous nation has relied in large measure of foreign capital and foreign technicians for its development, America’s railways in large measure were financed by British capital, the French helped them to build their chemical industries, thousands of foreign born engineers, doctors, scientists and technicians helped lay the basis for America’s sweeping modern new industries” “7.Chester Bowles; “Indo economic relations” Mc Graw hill Book Co., New York page 14, 1965”7.
It realized only during the Seventh Five Year Plan how technology up
gradations and transfer of technology will give impact on the economy as a
whole. hence the this plan recognized to consolidate on these strengths and
to take initiatives to prepare Indian industry to respond effectively to the
emerging challenges. A number of policies and procedures were
introduced in 1985 and 1986 under the leadership of Mr. Rajiv Ghandi
aimed at increased productivity reducing costs and improving quality but
these dosage to the economy does not made any significant improvement
and the crisis became bigger and bigger coming down to the economic
scene we find that India had plunged in to an unprecedented economic
crisis in 1990-91. "Borrowing analogy of Leibensteins low equilibrium
trap"11. The Indian economy was almost sinking in 1991 with foreign
exchange reserves plummeting in to an abnormally low level of $ 2.2
billion inflation in the vicinity of 14% and fiscal deficit raising to 8.4% of
GDP. On the top of this an unsustainable balance of payments crisis with
current account deficit as high as $9.9 million. Hence the earlier policies
should be viewed as no end to no return programs The new economic
reforms initiated by our prime minister Manmohan Singh at that time that
is in the year 1991 aimed at transparency, simplicity and end results. It is
however to be regretted that we are late comers in the field of liberalization
and opening up of the economy, markets have already been captured by the
"little tigers" of south east Asia (Korea, Singapore, Hongkong and
Taiwan). The liberalization reforms backed by “market friendly”
economy, should have come to India at least 18-20 years earlier when the
"little tigers" had embarked as such policies, however need for transfer of
technology and Joint Venture strategies to developing country like India
arises on the following important grounds:

1.23 Joint Venture and Technology Transfer Approach:

Following are the important points to be noted; Firstly,
Developing countries are in the backward state of technology, their
technological backwardness is reflected in high average cost of production
despite cheap labor and capital. Technological backwardness in turn has
lead to their economic backwardness, however the transfer of technology
and Joint Venture strategies from the developed countries brings advanced
production techniques and machines, innovation in products, skilled
personnel, organizational expertise and marketing techniques etc.,
Secondly; The technology transfer and Joint Venture from developed
countries required by developing countries to increase productivity of labor, capital and other factors of production in order to lower the per unit cost of production this can be done by transferring capital intensive techniques from the developed countries.

To reduce poverty, inequalities, and unemployment where these are the three pressing problems can be solved by arising the level of income of the people labor intensive or appropriate technology through Joint Venture and Technology Transfer from developed countries. Thirdly; Technology is a critical factor in modern economic growth. Technology has opened up infinite avenues of growth, resulting in both qualitative and quantitative improvements in production structure. A major thrust of recent technology has been on cost-saving techniques; possession and adoption of such technology has enabled many developing country to forge ahead and march hand in glove with developed country, on the contrary, technology laggards have been pushed behind and find many pressures developing on their growth process. Fourthly; Indian industries are faced with the problem of technological obsolescence because of this large segment of industry, productivity is low, costs are high and quality is poor. All these means losing out in the world market and cutting in to the rate of growth of income. Indian industries needs modernization. Modernization need be viewed as a multidimensional concept covering various aspects such as technology management, human capital etc., it may refer to an up gradation of existing technology, it may cover replacement of an obsolete machinery by an new machinery; it may even be necessary to import advanced technology which can not be developed indigenously along with better production processes. New management techniques would have to evolved and adopted, such as in the field of cost accounting etc., development of human capital so as to create a capital of competent technocrats, would form an integral part of modernization. A basic test of modernization is that it should lead to a substantial reduction in the unit cost of production that is an improvement in productivity implying "reduction in capital output ratio”. This is also implies the realization of economies of scale that would be achieved if the size of the unit is increased to the optimum level and there is full utilization of capacity. Fifthly; The developing countries need Joint Ventures and Technology Transfer to develop basic and key industries and infrastructures because they are lack in such infrastructure like transportation, power, telecommunication, software etc., developing economy requires Joint Venture and Technology Transfer strategies to make their economies
competitive in the international market. Also the global flow of physical resources such as capital and equipment, and transmission of intangible resources such as skills, techniques, and entrepreneurs is a universal phenomenon. The developing economies stand to gain considerably from the rich experience of the developed countries. Joint Venture and Technology Transfer are vital for the acceleration of growth mechanism in developing economies. The recent expansion of industrialization in India is substantially due to borrowed capital and know how. Sixthly; International capital movement are beneficial to the advanced economies also since majority or all of them have programs of industrialization often larger then their internal raw material and labor resource warrant, it is also true that corporations have now developed a new state of mind now it is now a fashion with larger companies to become multinational, and to have a global view of business. The large number of countries with which a corporations is directly associated, the greater the prestige that it commands in the business world. Besides profitability it finds other advantages in investing abroad like using a overseas subsidiaries as markets of parents corporations having complementary production of parts in different countries to secure the advantage of competitive costs and gaining market stability through geographical diversification. Seventhly; The import of foreign technical know how through and Joint Venture and Technology Transfer and capital will go long way in the international reconstruction. Machines and methods invested after long years of labor and capital could be readily adopted for increasing the productivity of the domestic industries thereby providing new job opportunities and increased standard of living of the people. Also transfer of new technology prove efficient in solving many of the pressing social and economic problems. To solve the balance of payments problems where Joint Venture and Technology Transfer brings capital, machinery, technical know how, expertise etc., further by helping in the establishment of export oriented and import substitution industries to reduce imports, thereby improving balance of payments. Joint Venture and Technology Transfer can save time and money because developing countries can make use of already tested and existing benefits of modern technology without having to traverse the difficult path through which the developed nations had to pass through to achieve the present high technological level. Thereby solving time and money.
1.24. History of Joint Venture and Technology Transfer in India:

Joint Venture and Technology Transfer have emerged as one of the most important and acceptable instruments of foreign investment and technology transfer from transactional corporations, as also from medium sized and small enterprises, in industrialized countries to private and public sector enterprises in many developing countries. The Joint Venture is generally refers to a business association of comparatively long duration between a foreign and a local enterprise or a number of foreign and local enterprises in order to carry out a venture. Joint Venture involves, varying degrees, the sharing of equity capital, investment risk, control and decision making authority and the profits and other benefits of operation. India’s policy for Joint Venture and Technology Transfer continues to be based on the colonial principles enunciated in the statement made in April 1949 by India’s first prime minister, Pandit Jawaharlal Nehru, in the parliament, this statement emphasized non discrimination between on Indian and foreign enterprise and the larger interest of the country. During the 1950’s and 1960’s the general policy was to allow the foreign partner minority participation to the extent of 51% domestic and 49% by foreign partner only. However, participation up to 100% was allowed in the interest of accelerated industrial development and to meet foreign exchange requirements.

1.25. Joint Venture and Technology Transfer industry in India:

Total foreign collaboration agreements and approvals and foreign direct investments approvals up to the year 2000 was 6,381 and foreign direct investment approvals was 9,986. Total amount approved is rupees over two lakh crores and actual inflow amount was rupees six lakh crores. 33 countries were entered into these agreements from this 9,384 were technical agreements, 3,251 were financial this total comes to 12,635. It is interesting to note that United States comprised of maximum share in foreign collaboration with 21.89%, Germany stood second with 18.06% and United Kingdom with 14.46%. If we see the sector wise distribution electrical and electronics is 21.06% which is maximum and industrial machinery 16.8%, chemicals 12.5%, mechanical engineering 11.5%, consulting and other services 5.0%, metallurgy 4.9% , transportation 4.6%, machine tools 2.2%, text tiles 1.5%, alternate source of energy 0.5% and others 18.9% respectively.
In the light of the above discussions the need for an in-depth analysis of economics of Joint Venture and Technology Transfer is felt. In this regard number of questions crop up like what has been the impact of the Joint Venture and Technology Transfer on income and employment generation? How for this is helping in generation of export earnings? Is it cost effective? What are the contribution of Joint Venture and Technology Transfer to our economy in the form of skill formation, improving quality and quantity of the products ultimately raising the standard of living of the people etc., these are to be analyzed in detail, further Joint Venture and Technology transfer industries requires certain facilities like, power, transport, financial institution etc., in availing these industries may encounter with certain constraints for their smooth working. All these questions will be analyzed in detail.

1.26. Brief Review of Literature:

Before spelling out the objectives of this study a brief review of literature related to Joint Venture and Technology Transfer would be worth attempting. We may study this under the following groups:

1. Macro level (International Level) studies on Joint Venture and Technology Transfer on secondary sources of information and data or impressionistic accounts with a macro perspective covering global approaches;

2. Micro level (National Level) studies, that is national level and state level studies on Joint Venture and Technology Transfer.

1. General Studies: International Level:

Economists and international business scholars Chenery (1955), Hirshman (1958), Rostow (1960), Kuznets (1973), Johnson (1975), Galbraith (1979), Brooks (1980), Porter (1985), and Hughes (1991), among others have long established that technology accompanied by an inflow of finance organizational skills, and knowledge stimulates industrialization and global economic growth and development. Hughes attributes between 40 to 60% of economic growth to technology. He defined to include organizational change as well as new product and new processes, he also suggests “for many developing countries, the impact has been even far greater as new techniques were inextricably tied
up with the development of markets, new economic institutions and government beaureocracies”. (Hughes 1991). In his work “Competitive Advantage Of Nations” by Michael Porter states “A firm as a collection of activities is a collection of technologies, technology is embodied in every value activity in a firm and technological change can effect competition through its impact on virtually any activity”. (Porter 1985). According to Gee, 1981, there is a general conscious that technology transfer accelerates the process of import substitution and export promotion more efficiently than indigenous entrepreneurs could achieve on their own. Gee suggests that technology diffusion enhances technological innovation by creating opportunities for these products to be applied to new users, increases the utilization of the existing scientific and technological base, lowers technical and commercial risks associates with innovation by expanding the potential market for them, and shortens the time frame for further innovations (Gee, 1981). Further more technology transfer is notably a decisive element in industrialization process since it allows developing economies to “Leap Frog” In to a modern and global industrial system, Newly industrializing economies are restricted in the ways in which they can secure new technologies. Often times, these economies are limited by indigenous constraints relating to inadequate core industrial and technical bases, low volumes of domestic demand, and unskilled technical and managerial human resources. Further more, the modest size of their markets makes it economically infeasible to design products or to support research and development on a large scale. Thus the only sound choice technocrats have gaining new technologies, when inventions are not possible is to buy or borrow it. According to Barron, 1969, increased access to technology alone, how ever, does not directly lead to economic growth, Barron writes “Undeveloped areas find themselves in the basic dilemma of neither being able to utilize foreign technology effectively, nor having the resources and capabilities necessary for conversion of foreign technologies”. According to Ajami And Arch 1990; Branson 1969; Doe 1984; And Bienfield 1984. Technology transfer is usually analyzed in the context of Four interrelated themes: Firstly, Inappropriateness of technology in relation to factor endowments. Secondly, Restricted availability of technology. Thirdly, The cost of technology and, Fourthly, Technology dependence. The “Inappropriateness” of imported technologies to newly industrializing economies, given relative factor endowments, the limited infrastructures for substituting labor intensive for capital intensive technologies, and socio-cultural barriers to adapting to technological innovations all contribute to the inability of developing
economies to reap the potential benefits of imported technology. According to Holleiner (1973), the appropriateness of technology arises flow what Holleiner has termed "Technological Fixity" or factor substitution inflexibility in the production process; which leads to a relatively higher level of capital intensity than warranted given the factor endowment of the developing country.

However all these studies stress on technology transfer, and innovations, but are only restricted to technology transfer and innovations. As we are aware developing countries cannot cope up with advanced nations in technology the affectivity and impact can only be achieved through Joint Ventures, which is more effective as well as efficient, hence it is very important to analyze the impact of Joint Venture strategies for rapid industrialization in emerging global challenges.

2. Micro Level or National Level Studies:

"India – Planning for Industrialization" by Jagadish N.Bhagavati and Padma Deasi is a scholarly work on India’s experience with industrialization since independence. This study not only review’s the historical trends and growth during the two decades since independence but also examines a wide ranging economic issues influencing the overall industrial development such as external resources, foreign trade policy instruments domestic policy instruments and the institutional constraints bringing out the weakness of industrial planning the authors maintains that Indian planning for industrialization suffered from excessive attention to targets down to product level and a waste ful physical approach to setting the implementation thereof along with a generally inefficient framework of economic policies designed to regulate the growth of industrialization”. This publication no doubt a valuable contribution to the existing literature on the subject, but does not cover other important issues of Indian industries such as state wise industrial growth, and the emerging regional industrial structure, the spatial distribution of industries, the dispersal policies etc., and role of technology in industrial development how innovation helps in economic development? How to acquire technology through Joint Venture Technology Transfer strategies etc.,? George Rosen’s work “Industrial Change In India” is a pioneering study of technological change in five Indian industries namely, cement, paper, iron and steel, sugar and cotton textiles over the period 1939-1953. For the five industries studied, the author not only computes certain economic ratio’s
but attempts at solutions for the conceptual and methodological problems that arise in their computation. The average capital output ratio’s in those industries shows a raising trend during the post war period. Further the marginal capital output coefficients in the industries studied are roughly equal to the ratio’s found in the developed countries, countries with factor endowments. Indian industries are faced with the problem of technological obsolescence. The dimensions of technological obsolescence could be gauged from the fact that in case of cotton textiles about 75% of looms are reportedly 20 years old and 68% of the spindles are more than 15 years old. Similarly in case of paper industries the equipment in some mills is 40 to 50 years old. Like wise in the case of sugar, out of 323 mills as in November 1981, 205 mills had a capacity of less than 1250 tons per day as against the optimum capacity of 1500 tons per day. Further as many as 130 mills were over 25 years old by 1977 itself requiring replacement.71 out of 107 wet and semidry process kilns in the cement industries were 20 years old. Because of technological obsolescence in a large segment of industry, productivity is low, costs high and quality is poor. All this means losing out in the world market and cutting in to the rate of growth of income. Indian industries needs modernization. “Location of Industries in India” By Tulsi ram Sharma was perhaps the first original and systematic work on the location of industries in India. In this study the author makes an attempt to examine the location trends and the regional distribution of six selected important industries viz., cotton, woolen, jute, iron and steel and sugar and leather during 1921-1951 apart from the study of broad location at trends in these industries based on Alfred Weber’s theory of industrial location, the author examines the part played by the factors such as means of communication availability of skilled labor and development of electricity in influencing the distribution and location of industries. In spite of limited nature of the enquiry it presents a clear picture of the then existing distribution of industries selected for the study, in the various regions of the country, points outs the short comings of such distribution and suggests the remedies there for however the author does not express the role of technology and transfer of technology and need for joint ventures for these industries. Another interesting and useful study in the field of Industrial Economics relates to “Structure Of Indian Industries” by M.M Mehta. The study examines the trends in the size, location of industrial units in the seven selected Indian industries namely, cotton, jute, sugar, iron steel, coal, paper, and cement covering the period 1905-1959. The
author make several interesting observations on the interrelationship between the size, location and integration. For instance he finds that generally speaking the wider dispersion of raw materials and markets the smaller is the size of the individual units. At the same time, the smaller the size of the industrial unit, the less is the localization of the industry. While the larger the size of unit, greater seems to be the degree of localization of the industry concerned. As regards the relation between size and integration, Mehta finds that financial, managerial and administration integration of industrial units has tended to counteract or at least mitigate some of the disadvantages arising from the small size. Even though the studies throws light on some of the important issues of the industrial organization its coverage is limited both in terms of number of industries and the issues examined. However the author does not explain the key factors such as technology adapted and role of technology in these industries. It could be seen that the latter three studies covered limited numbers, though significant in terms of their share of industries however, role of technology, technology up gradation, and acquire of latest technology through Joint Venture and Technology Transfer and modernization which are the key issues has not been discussed. “Regional Aspect of Indian Industrialization” by Yogender R. Alag is another addition to the scanty literature on the subject, based on the ASI (census sector) data for 1965, the author first examines the historical pattern of Indian industrialization. He finds that the industries in India have grown in relatively self contained technologically interlinked clusters making use of industrial base technique, he isolates blocks of interrelated industries in each of the states. The exercise reveals that the regional clustering of industries is associated with agglomeration economies. Finally the author suggests a framework for incorporating the regional aspect in to industrial planning models.

At this stage, It may be note that all the studies reviewed so far, though with the limited scope of enquiry, are all India studies, a reference to literature on this area of research at the regional level is not out of context.

3. Regional Studies:

The regional studies on the subject that has come about in recent years based on their scope of enquiry may fall under two broad categories. While quite a few studies have a comprehensive coverage of all
the aspects of industrial development of a region, others mainly deals with a specific issue relating to the subject. To the first category belong to the study by K. Rama Krishna Sharma on “Industrial Development Of Andhra Pradesh” and another study by Kulvinder Kaur titled “Structure of Industries in India- Pattern, Framework, Disparities”. Both these studies are based on their PhD Theses approval. To the second category belong “Industrial Dispersal Policies by M.D God Bole and another study on “Spatial Diversification of Industries –A Study in Uttar Pradesh” by T.S Papola. Sharma’s work on industrial development of Andhra Pradesh is thoughtful and authoritative. It is an empirical study which broadly covers the period from 1960 and 1976. A comprehensive work covering the industrial growth of the state and of its regions and districts. It examine, interregional disparities over a period of time, considers the growth and development problems of the different sectors and public and corporate sectors and analyses the structural changes that have taken place in these sectors. The study also evaluates the role of different state level promotional agencies in the industrial development of Andhra Pradesh. Finally, it makes a study of the impact of incentive schemes on the development of the backward areas of the state and offers some valuable suggestions. The study of Kulwinder Kaur is an “analysis of the process of industrialization in Haryana over the period of 1966-78.” Within the broad framework of certain aspects of industrialization such as process, pattern, and spatial structure of industries are selected for intensive exploration. The study, among other things, emphasizes the fact that industrialization and infrastructure tends to develop side by side and that despite the increase in the industrial sector’s share in the state’s income, the dependence of the state’s income, the dependence of the state’s economy on agriculture has not lessened. Further the process of industrialization in Haryana has produced glaring inter-regional imbalances. God bole’s study on “Industrial Dispersal Policies” in Maharashtra state. It attempts to assess the success of these policies from the point of view of financial institutions and development agencies as also from the view point of the beneficiary units. The important findings and conclusions of the study. As it was felt appropriate have been stated in the chapter “Public Policy and Location”. Similarly, the study on “Spatial Diversification of Industries – A Study of Andhra Pradesh” by Papola attempts an examination of traditional postulates regarding location and spatial dispersal of industries and assessment of some of the current policy instruments aimed at influencing industries location in favor of backward areas. Based on detailed analysis of the secondary data as well as
information collected from a large sample of industrial units, it provides a sound empirical base for drawing conclusions on the issues involved. Though the analysis has been carried out in relation to the locational behavior of industrial units in Uttar Pradesh in the recent past, the questions sought to be answered, mode of analysis and conclusions are general validity. Now the drawbacks of the earlier studies and issues for the present study are briefly indicated in the next section.

1.2.7 Research Issues:

The review of literature indicates that though there have been quite a number of studies in recent years on the subject, the available studies suffer from a number of drawbacks. These studies indicated the gaps to be filled in as well as the need for further studies with more rigorous empirical and theoretical support. In so far as the general or macro level studies are concerned they are mostly impressionistic accounts, and too general in nature confining their attention to issues like technology and growth, borrowing of technology, etc., also the micro level and national level studies are too general in nature. The work done so far in the field all India studies have limited scope of inquiry in terms of either the coverage of industries or the subject control, and no systematic and comprehensive study covering the vital aspects of Indian industries has been made especially. These studies will not throw light on the technology upgradation, choice of technology, role of technology in industrial development. How to acquire new technology? Whether through indigenous research and development or through Joint Venture and Technology Transfer strategies etc.,

In the light of the review of literature, the need for an in depth analysis of the impact of Joint Venture and Technology Transfer for rapid industrial development is felt. In particular what has been the impact of Joint Venture and Technology Transfer strategies on rapid industrialization? employment generation? Etc., .The aspect chosen for a detail scrutiny are so important in the Indian context as macro level analysis and Karnataka as a micro level analysis that they not only provide a new insight into the industrial economy but suggest the desired pattern of industrial development in the country. The study will reveals the research gap in the subject and further detailed analysis is going to fill the gaps as well as the need for further studies with more rigorous empirical and theoretical support.
Further more country like India which is technologically backward cannot cope with the technologically advanced countries wherein there is continuous technology upgradation and development. As we seen United States which is one of the most developed economy had taken the help of other developed economies like France, Great Britain etc., Why we Indians should not take the help of developed countries through Joint Venture and Technology Transfer For solid state industrialization? Also self reliance and import substitution seems to be infant argument and these strategies looks inward and will not help to emerge out leader in global economy. Hence It is worth to attempt to find the importance of Joint Venture and Technology Transfer and its impact on rapid industrialization.

1.28 Objectives:

In the light of the above discussions the present study seeks to make an economic analysis of the Joint Venture and Technology Transfer for rapid industrial development. Apart from the macro level analysis of the progress and performance of Joint Venture industries in Karnataka. Based on secondary data study also provides an in depth economic analysis of the Joint Venture programs using micro level data for a Joint Venture and Without Joint Venture industries. The specific objectives of the study are as follows:

1. To attempt a macro level analysis of Joint Venture and Technology Transfer industries in Karnataka through review of progress and performance with reference to physical and financial progress.

2. To analyze the impact of Joint Venture and Technology Transfer on employment potential, income generation, quality and quantity of products, export earnings, skill formations etc.,

3. To analyze the structure of cost and returns of Joint Venture and Technology Transfer industries, Process of updating the technology, modernization programs etc.,

4. To examine the constraints and problems faced by Joint Venture and Technology Transfer industries.
5. To examine the policies and procedures adopted by Joint Venture industries to achieve productivity, profitability, and growth.

Methodology:
1.29. Study Region:

Study region is Karnataka state, today Karnataka is one of the foremost industrial states in India, it has a broad range of industries notably, electronics, telecommunications, electrical, chemical, engineering, computer software etc., The state is well endowed with natural resources and has an extensive technological infrastructure of research institutions for higher learning, quality man power with good work ethics makes Karnataka attractive to entrepreneurs. The state of Karnataka in general and Bangalore in particular has emerged as one of the most important centers of technology driven enterprise in the country. National research laboratory, technical skills, public institutions for high technology utilization and technological talent led to suggest that Bangalore is silicon valley of India.

There are about 998 medium and large industries in Karnataka with a total investment of about rupees 4500 crores employing about 3.5 lakh people. It is to be noted that one out of four units in the organized sector have one or more foreign collaborations. Foreign collaborations based companies accounts for more than 40% exports from the state also foreign collaborations industries which account for 70% of the total investment and contributed about 57% of the turnover and 50% of the total employment. A pioneer in trade and industry since decades Karnataka continues to retain its name among the top five industrialized states in the nation, drawing investments worth crores of rupees, especially in the information technology and manufacturing sectors, be it electronics and telecommunications, precision engineering, automobiles, readymade garments, biotechnology or food processing, Karnataka has a share in every sector. When these are considered as many as 141 mega projects, with a total investment of rupees 59,994 crores have been approved. Besides, 562 large and medium projects with investment of rupees 10,031 crores have been cleared. The center has given its nod to 934 foreign direct investment proposals with rupees 7,826 crores. the investment in state have witnessed a quantum jump in the last few years proving that Karnataka is among the favored destinations of industrialists.
Secondary data have been used to analyze the impact of Joint Venture and Technology Transfer approach for rapid industrialization. The secondary data were collected from published official records from various concerned government and private sectors departments, supplemented by information and data in non-official studies, those of individual researchers etc., the secondary data were also collected from websites of industries as well as governments departments through internet and e-mails. The secondary data have been analyzed to examine the performance of Joint Venture and without Joint Venture industries. Here the achievement of these industries like profitability, productivity, capacity utilization, inventory management, were analyzed and compared. The primary data were collected from selected executives of Joint Venture and without Joint Venture industries. These data were used to analyze the policies and procedures followed in these industries and compared both. For an analysis of this nature, which seeks to analyze the impact of Joint Venture and Technology Transfer approach the selected variables in project appraisal, we have used “with” and “without” project approach. With and without approach have been used to analyze the impact of Joint Venture and Technology Transfer like modernization, technology upgradation, productivity and profitability etc.,

1.31. Sample design:

To select the ultimate unit of analysis that is Joint Ventures and without Joint Venture industries, we followed the random sampling method. First we obtained the list of Joint Venture and without Joint Venture industries located in Karnataka then arranged the same. By using the random numbers table we selected the required number of industries. The detailed sample design, characteristics of the sample is discussed in chapter four.

1.32. Statistical Techniques:

To analyze the collected secondary data we used the descriptive cum tabular statistics, we have used statistical tools such as ratio, percentage and production function, regression analysis, key financial ratio analysis to analyze the questions posed in our study more
ils about the methodology and tools used for the analysis are indicated in relevant chapters. The discussion in the study are organized into VII chapters.

**Chapter Scheme:**

Chapter I is the introduction which presents the introduction, review of literature, objectives, methodology, study region, sample design, statistical techniques in detail. Chapter II presents the industrial development in Karnataka, post and pre independence, industrial development during plan periods. Joint Venture industries in Karnataka etc., Chapter III depicts the salient features of Joint Venture and Technology Transfer industries and the detailed procedures policies and types of technology etc., Chapter IV presents the detailed data of selected Joint Venture and without Joint Venture industries, company profiles tables depicting expenditure, employee cost, export earnings, total income and profitability etc., Chapter V presents the econometric analysis of Joint Venture and Without Joint Venture Industries, through key financial ratios, production functions and multiple regression. Chapter VI presents the summary, findings, conclusions, suggestions and recommendations. Chapter VII is the bibliography followed by appendix.

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