

6. Minerals and industrial location

Manufacturing industries

1. Location

1. **Market:** Closeness to market, demand in the market, paying capacity of the market are key determinants in location factors. **Cotton textile** industries are close to urban centres like **Mumbai**, **Ahmedabad**, etc.
2. **Labour:** Cheap labour and adequate availability is a key issue. **China** has seen **remarkable growth in manufacturing** because of availability of surplus labour and low wages.
3. **Raw materials:** Industries using **weight losing raw materials** are located close to the raw-material sources. Ex: **Sugar mills** in India are close to the sugarcane growing areas. **Iron and steel industries** near **coal fields** or **iron ore** mines.
4. **Transport:** Adequate and cheap transport is essential for transport of inputs and finished goods. The **Rhine valley in Germany** has emerged as a manufacturing hub because of the extensively developed **waterway**.
5. **Power:** It is a significant factor for energy intensive industries. **Canada and Norway have aluminium refineries** despite having no bauxite resources because of cheap electricity from hydro power.
6. **Government policy:** Establishment of **iron and steel industry** in **Bhilai** and **Rourkela** were based on decision to develop backward tribal areas.
7. **Industrial inertia:** High **capital industries are reluctant to shift their bases** despite change in market condition due to the well established supply chain and government policies. Detroit still boasts automobile companies despite slowing market and labour availability.
8. **Geography:** The **topography, climate** of the area is **another determinant**. **Canada has numerous paper mills** because of the economies of scale of lumbering in its coniferous forests coupled by **cheap transport** through the rivers.

2. Risk reduction measures in industrial areas

1. **Densely populated residential areas** should be separated far away

from the industrial areas.

2. People staying in the vicinity of industries should be aware of the storage of toxins or hazardous substances and their possible effects in case if an accident occurs. This empowers people about possible potential hazards.
3. Fire warning and fighting system should be improved.
4. Storage capacity of toxic substances should be limited.
5. Pollution dispersion qualities in the industries should be improved.

3. Agglomeration economies

1. Many industries benefit from nearness to a leader industry and other similar industries. These benefits are termed as agglomeration economies. Savings are derived from the linkages which exist between different industries.
2. Many industries tend to come together to make use of the advantages offered by the urban centres. Industrialisation and urbanisation go hand in hand. Cities provide markets and also provide services such as banking, insurance, transport, labour, consultants and financial advice, etc. to the industry

4. Why Hooghly industrial belt developed

1. This belt developed around Kolkata as the nucleus. The mouth of river Hooghly presented ideal conditions for development of a port. The Ganga and Brahmaputra linked the belt with rich hinterland. These links were later supplemented and strengthened by rail and road links.
2. Kolkata was the British Indian capital from 1773 to 1911. This ensured continuous British capital investment.
3. Tea plantations in close proximity in Assam and Bengal, processing of indigo earlier and jute later coupled with the discovery of coal and iron ore in the Chhotanagpur Plateau region contributed to the industrial development of the Hooghly industrial region.
4. Cheap labour was easily available from thickly populated and out-migrating states of Bihar, Orissa and eastern Uttar Pradesh.
5. Presently, this region supports a variety of industries which include iron and steel, heavy engineering, rail equipment, transport equipment, chemicals, oil refining, agro-processing, textiles, paper, fertilisers and diverse consumer goods.

5. Why Ahmedabad-Vadodara belt developed

1. This region is characterised by an inland location in the **cotton growing Gujarat plains**.
2. The **decline of cotton textile industry of Mumbai** due to high transportation costs of cotton from the peninsular region and easy access of Ahmedabad-Vadodara region to raw cotton worked to the advantage of this belt.
3. The petrochemical industry around Vadodara and Ankleshwar **developed after oil was discovered** in the Gulf of Cambay.
4. **Location of Kandla port** is an obvious advantage.
5. The **densely populated northern plains** in close proximity provided an easy market.

6. Chotanagpur region

1. Discovery of **coal and iron in the Bihar-Orissa** belt and location of these resources in close proximity to each other facilitated easy utilisation.
2. Easy **availability of power from the Damodar Valley Project** and from coal-based thermal power projects helped in industrialisation.
3. Availability of **cheap labour from Bihar**, Orissa and eastern Uttar Pradesh was of great advantage.
4. **Proximity to port and access to large market** in the vicinity also worked to the advantage of this belt.

7. Mumbai-Pune region

1. In 1774, the **British acquired the island of Mumbai** as a site to develop a port.
2. In 1853, the 34-km **Mumbai-Thane rail ushered in industrialisation**. Opening of routes to Pune and to Nasik extended the region's influence to the hinterland.
3. The **opening of the Suez canal** in 1869 established closer links with Europe. This facilitated easy import of capital goods through the port.
4. Easy **availability of raw cotton from the black soil belt** of the Narmada and Tapi. Coastal humid climate which was ideal for weaving and spinning of cotton.
5. Easy availability of **hydel power from the Western Ghats**.
6. **Location of the port on the west coast** which ensured ready access

to western markets.

8. Southern region

1. This **region is dominated by cotton textiles** as raw material is readily available from cotton growing tracts.
2. **Cheap hydroelectric** power from Mettur, Sivasundaram and Sharavati dams.
3. **High grade iron ore and limestone** from Bhundiguda, manganese from Shimoga and other raw materials are easily available.
4. Well connected links to nearby areas through **road, rail** and as well through ports.
5. **Availability of cheap skilled labour**, proximity to local market and a good humid climate.
6. The famous **Visvesvaraya Iron and Steel Plant** was set up because of these favourable factors. Coimbatore and Madurai are famous for cotton and silk textiles. Other important areas of this industrial region are **Sivakasi** for firecrackers and **Mettur in Mysore for handicraft** and sandalwood articles.

Shale gas

Shale gas refers to natural gas produced from shale, a type of fine-grained sedimentary rock. It is an unconventional gas reservoir as the gas is trapped within the impermeable shale rocks, which inhibits the gas from migrating towards the earth's surface to more permeable rocks.

Importance of shale gas for India - India is the third largest consumer of energy in the world after China and USA, but it is not endowed with abundant energy resources. High reliance on imported energy imperils fiscal stability given volatile energy prices, and also impinges adversely on energy security. Meeting the energy needs of the nation at affordable prices, therefore, presents a major challenge. Thus, the emergence of unconventional sources of gas, particularly shale gas, holds special relevance for India.

Distribution of shale gas in India

According to Ministry of Petroleum and Natural Gas, the following sedimentary basins are considered prospective basins for Shale oil and gas:

- Cambay Basin
- Gondwana Basin
- KG Basin
- Cauvery Basin
- Indo-Gangetic Basin
- Assam-Arakan Basin

Challenges in Shale gas

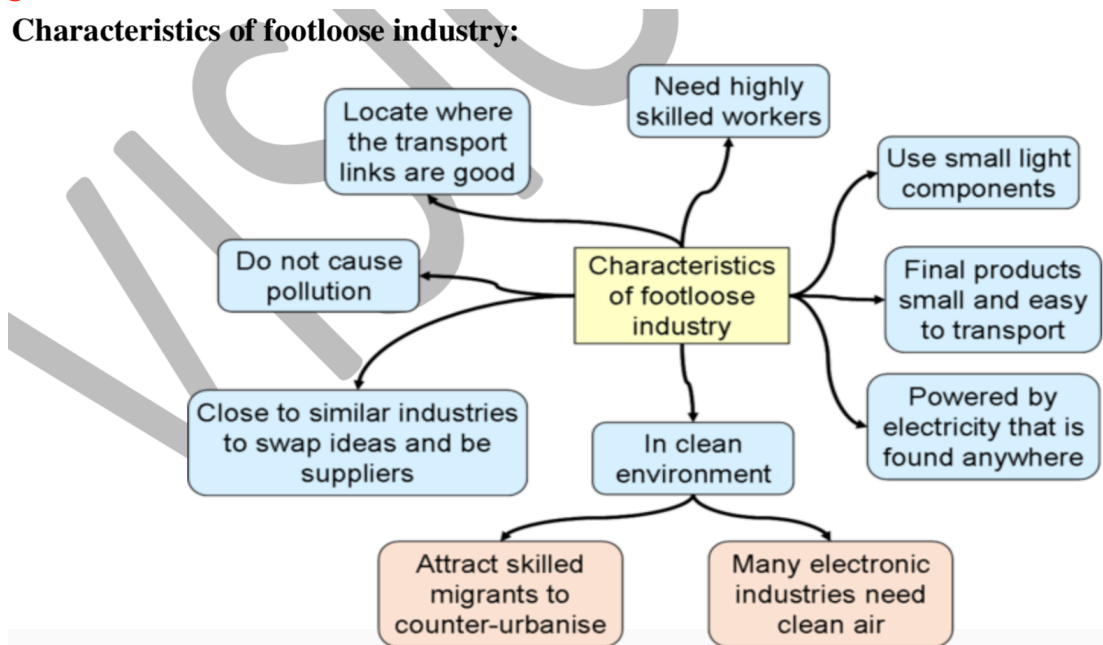
1. **Water intensive:** The hydraulic fracking techniques huge quantities of water to pump the gas to the surface.

2. **Water contamination:** Water after hydraulic fracturing is flowed back to the surface and may have high content of dissolved solids and other contaminants.
3. **Land acquisition:** Requirements are much greater than conventional gas.
4. **Seismic risks:** Zone III-V earthquake prone regions.
5. **Other challenges** like scientific and credible resource assessment.

Foot-loose industries

1. **Footloose industries** are those industries whose **location is not influenced** by either **access to material or markets**, and which can therefore operate within a **very wide range of locations**.
2. These industries often have spatially **fixed costs**, which means that the **costs of the products do not change** despite where the product is assembled. These industries usually requires a **very small production space**, are usually **less polluting** and but **require highly skilled workers**.
Ex: **Bakery, watch-manufacturing, IT, diamond cutting, electronics goods, automotive firms** etc.

Characteristics of footloose industry:



3.

4. Factors

1. **Transport and communication links** is one of the most important factors, as it is important to be close to **good roads and rail links** so that industries can receive supplies and distribute products.

2. **Government policies** are instrumental in creating each set of local conditions and influence their location in terms of **favourable legislation, tax concession, grants** and loans and promotional benefits.
3. **Cheap and skilled labour** is one more very important factor determining location of footloose. Ex: **IT industry concentrated in Bangalore**.
4. **Capital availability** and **ancillary services** is another important factor, as it needed to start a business and provide basic input. Generally these industries tend to develop where **financial services** are easily accessible.
5. Increasing **land prices** effects the location and now these footloose industries are establishing on the edge of cities as land is often cheaper there than in the centre.
6. Availability of **infrastructure** and **agglomeration**, related infrastructure and provisioning services are dealt through government policies and advantage of **cheaper land, energy supplies**, and other **costs of doing business** attract them. Further agglomeration will decrease cost of production by external economies of scale.

Sugar industry

1. It **needs irrigation** and is planted in February and harvested in October. **Sugar mills are located near sugar growing areas**, because **sugar is a perishable crop** and needs quick transportation. For sugar, **warmer climate gives better yield**. So, Maharashtra grows thicker variety of sugarcane.
2. Proximity to **ocean can lead to less temperature variations**, so it increases the **sugar yield** and **crushing season can be longer**. Black lava soil is fertile and retains water. So, it is good for growth. If labour available are more, cost of production is low.
3. **India stands second as a world producer of sugar** but occupies the first place in the production of gur and khandsari. In recent years, there is a **tendency for the mills to shift and concentrate in the southern and western states**, especially in Maharashtra. This is because the cane produced here has a higher sucrose content.
4. Also, in **South India** there is no loo, no frost and **moderating effect of**

ocean makes it ideal for sugarcane growth. The cooler climate also ensures a longer crushing season. Moreover, the cooperatives are more successful in these states.

5. Suited to cooperative sector

1. Sugar production is seasonal in nature. Once the sugar growing season is out, farmers have nothing to do. So, they form cooperatives and pool their resources to process the sugarcane by themselves. This gives them better profits and they will not be out of work at any time in the year.
2. Cooperative sector has been more successful in southern and western states, which also provides favourable climatic conditions for sugar to grow.
3. To save the farmers from violent fluctuations in the Gur, Jaggery and Sugar markets.
4. Facilitates socio-economic, educational and cultural development of the entire area surrounding the sugar factories.

Problems facing the sugar industry in India

- Low yield per hectare of sugarcane in India in comparison to other countries.
- **Short crushing season** – It makes the industry seasonal creating financial problems for the sector.
- **Fluctuating production trends** – leads to years of severe shortfall, followed by bumper harvest.
- High cost of production due to high cost of sugarcane, inefficient obsolete technology, uneconomic process of production and heavy excise duty result in high cost of manufacturing.
- Small and uneconomic size of mills with obsolete machinery.
- **Distortion in cropping pattern** – Sugarcane production is water-intensive and is located in water-scarce areas like Maharashtra.
- **Competition from khandsari and gur**: In India, 10 tonnes of sugar are obtained from 100 tonnes of cane but in case of khandsari only 7 tonnes of sugar are derived. The recovery content of gur is only 5 per cent. Thus there is a net loss to country by use of cane for khandsari and gur.
- **Policy issues**- state governments often announce higher Fair and Remunerative Prices (FRP) for the season, often ignoring market dynamics. The mills are required to pay FRP to farmers but are left to market for recovery. In times of bumper production, the market price of sugar almost always becomes uneconomic whereas FRP remains higher. This leads to delay in payments to farmers.

Fisheries industry

1. Fisheries contribute **5% of agriculture GDP** and **0.6% of total GDP**. Fishes eat plankton and Phytoplankton require sunlight. So fishes can develop well in **continental shelves** and **shallow seas** because of Sunlight penetration and minerals from coastal water.
2. **Some fishing grounds**
 1. They are more in number where **cold currents and warm currents**

meet. Ex: Gulf stream and Labrador in North western Atlantic coast, Kurushio and Oyashio in Japan.

2. Dogger bank, Great bank in Europe. Grand bank, George bank, Nova Scotia, Newfoundland in US and Canada.

3. Factors suitable

1. Fish gutting leads to weight loss. Hence fish processing is either done on the vessel or near the coastal plants.
2. Highly indented coastline provides many sites for harbours and ports, so more fish can be caught.
3. The cool temperate climate favours large scale commercial fishing, preservation and storage of fish. While tropical areas are hot and moist where fish cannot be stored for long.
4. In hilly terrain areas due to cold long winters agriculture is not practised, so more people switch to fishing. Ex: Iceland, Japan, Norway.

4. Northern America and Europe vs Asia

1. Asia has tropical climate, where fish cannot be stored for long. While N.America and Europe have temperate cool climate which favours long storage.
2. Asia has relatively smooth coast line. So, less natural harbours than Europe, N.America.
3. Continental shelves in Asia are narrower than Europe, North America.
4. Commercial fishing requires large ships, which can scan fishes for optimal location in seas and can process them. Such vessels and technology require massive capital investment which is available in Europe, America but not much in Asia.
5. In tropical regions of Asia, variety of fishes occur in smaller groups, so not good for large scale commercial exploitation.
6. Tropical fishes have higher oil content which makes them less desirable for eating.

5. Northern Hemisphere vs Southern Hemisphere

1. Population size is high in North Hemisphere, so fish demand is large. In Southern hemisphere nations such as Argentina, New Zealand and Australia, meat and dairy products are plenty. So, not much demand for fishes.
2. Continental shelves in Southern Hemisphere are narrower than

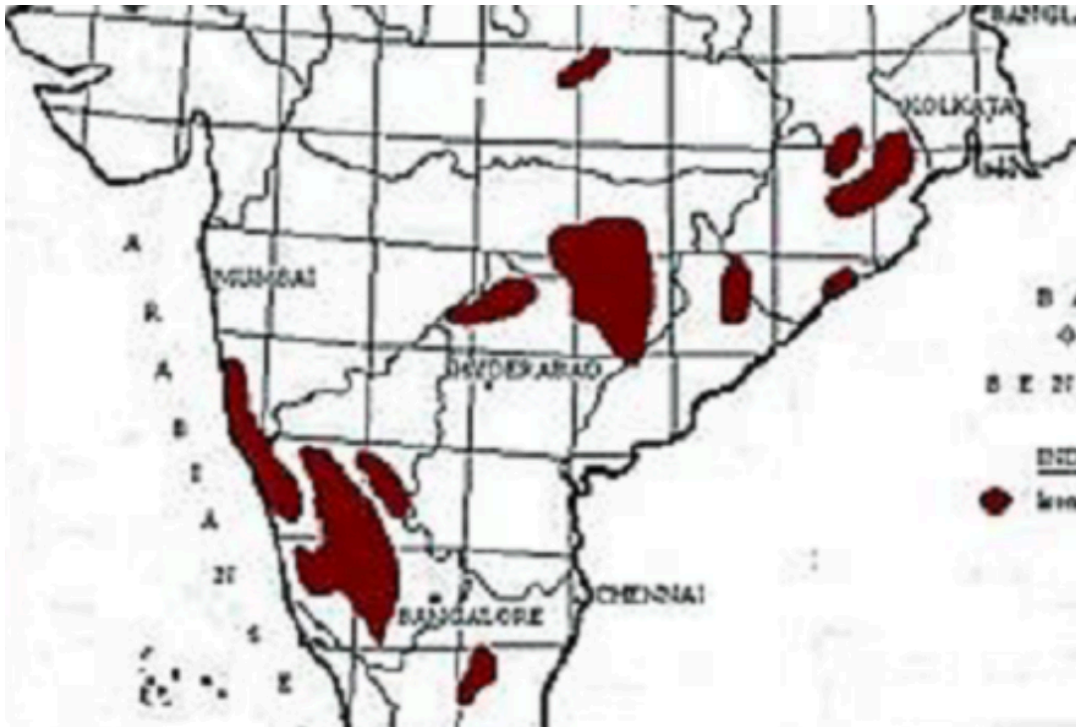
Europe, North America.

6. In India why western coast has more fish production

1. **Commercial varieties** like **Prawns** and **Mackerel** are mostly confined along western coast.
2. The **Kerala coast** largely experiences **significant upwelling** during south-west monsoon period, resulting in abundant phytoplankton.
3. **Only one third of full time fishermen** are located on India's east coast, while two thirds are from the west coast only.
4. While **traditional catamarans** are common along the **east coast**, most fisheries production from the **west coast** is derived from the **mechanised** sector.
5. **Fisheries in the backwaters** and estuaries of west coast tend to be undertaken throughout the year whereas the marine **coastal fishery** (mostly in east coast) is seasonal with a regulated, variable closed season during the monsoon period.

Iron and Steel industry

1. The **three essential inputs for iron and steel** industry are **iron ore**, **coking coal** and **limestone**, **water** for cooling and energy for heating. In iron and steel industries, iron ore and coal both are weight-losing raw materials. Therefore, an optimum location for **iron and steel industries** should be near raw material sources. This is why most of the iron and steel industries are **located either near coalfields** (Bokaro) or near sources of **iron ore** (Bhadravati, Bhilai, and Rourkela).



2.

3. Locational factors

1. **Near iron ore mines:** To reduce the transportation cost, Industries are located near mines with Iron ore, manganese, limestone, dolomite deposits. For example, **Rourkela** in India.
 2. **Transportation:** Location near **coastal regions** reduces the cost of transporting raw material (usually imported) from port to factories. For example, **Vishakhapatnam** in India.
 3. **Modern Technology:** Such as electric smelters have helped in **shifting of steel industries away from coal and iron-ore reserves** by making efficient use of scrap metal & also reducing energy requirement. For example, Bhushan **steel plant in Ghaziabad**.
 4. **Industrial Inertia:** Industries continue to be located in the same area despite decline of locational advantages e.g. depletion of raw material. For example, **Ruhr in Germany; Pittsburg in the USA**.
 5. **Developmental policies** of government for backward regions. For example, **Bhilai and Salem plants in India**.
 6. **Strategic reasons:** After WWII, the USA and the USSR adopted a policy to not allow the concentration of the industry in one region. Thus, in the USA some plants were setup in the western region such as California and the USSR in the eastern side towards Pacific coast.
4. **Near forest — Ancient times**

1. **Until the end of medieval period**, iron production was done on small scale and energy available was thorough **charcoal**. To **produce five tons of iron**, you had to chop down one acre of forest to get sufficient charcoal. Therefore, **wood supply was primary factor** for deciding location and **smelters were usually setup** near forest areas.
2. Even in modern times, **Visvesvaraya Iron and Steel plant** (Karnataka) was setup near jungle to get wood charcoal.

5. **Near coal fields — Industrial revolution**

1. In Britain, **iron ore was found embedded with coal seams**. So, same area provided both iron ore and coal. During that era, to process one ton of iron ore, **you needed 8-12 tons of coal**. Railway engines were also inefficient. So, weight-wise, it was **cheaper to transport iron ore to coalfields** rather than transporting coal to iron ore site.

2. **Examples**

1. Ruhr Valley, Saxony region in Germany.
2. Britain — Lancashire, York shire, South wales.
3. US — Appalachian-Pennsylvania-great lakes.
4. Australia — New South Wales region.
5. China — Wuhan, Anshan, Chongqing.

6. **Coastal areas**

1. By early 20th century the **coal and iron ore mines in US-Europe** started getting **depleted**. So, they **started importing iron ore** from other countries. As a result the iron space and steel industry **started moving toward coastal sites** to reduce cost of transporting ores from port to factory via railways.

2. **Examples**

1. **Steel industry in Osaka-Kobe of Japan**.
2. **Steel plants at Vishakhapatnam, Ratnagiri, Mangalore** in India.
3. **Malaysia has iron ore but not enough coal**. Therefore steel plants located near coastal area to get imported coal at minimum transport cost.
4. In the **coastal cities** of **Cleveland, Detroit, Chicago in USA**.

7. **Industrial inertia**

1. Today, **coal is not the only source of energy**. We have **natural gas**,

hydel electricity even nuclear power and also thanks to new technologies in steel production, you don't need massive amount of coking coal.

2. **Labour:** As time progressed, area near coal fields developed into industrial cities. So, there is already a large pool of skilled and experienced workers, support services. New area may not have the same labour supply.
3. **Transport:** The railroad, transport and communication infrastructure are well developed in the old area. Therefore, even if local raw material supply is exhausted, they can be imported from other areas.
4. **Capital:** It is usually cheaper to modernise or expand an existing location rather than move to a new site.
5. **Market:** Iron and steel industries provide raw material to many secondary manufacturing industries such as automobile, heavy engineering etc. It will affect profit levels as they lose important customers.
6. **Government policy:** The industrialists in old area usually have deep pockets and political connections so they lobby to government for favourable protectionist policies.

Steel industry

1. The industry is one of the most capital intensive industries and is concentrated in North America, Europe and Asia. Since most of the coalfields are located in the middle latitudes, iron steel industry developed in these latitudes.
2. Since steel is the raw material for many secondary industries like automobiles, important industrial regions of the World usually found at middle latitudes. On the other hand, tropical belt doesn't have any significant coal mines. So, hardly any industrial development.
3. In U.S.A, most of the production comes from the north Appalachian region, Great Lake region and the Atlantic coast. The industry has also moved towards the southern state of Alabama. Pittsburg area is now losing ground. In Europe, U.K., Germany, France, Belgium, Luxembourg, the Netherlands and Russia are the leading producers.
4. **Dominance of Chotanagpur plateau region**

1. **Low cost of iron ore** is available, since it is mined in this region.
2. This region is in **proximity to coal producing states**. So cheap raw material available. Other supplement minerals like **manganese, bauxite and limestone** are found in this part of the plateau in abundance.
3. Cheap, hard and **skilled labour** is **easily available**.
4. These **industries have sea ports** of the Indian peninsula like, **Haldia, Paradip**, Vishakhapatnam, Chennai etc., near to them.
5. **Inland waterways** and **good network of roads** to serve domestic market well.

Cotton industry

1. In **ancient India**, cotton textiles were produced with **hand spinning** and **handloom weaving** techniques. But the **production of hand woven cotton textile was expensive** and **time consuming**. Hence, traditional cotton textile industry could not face the competition from the new textile mills of the West, which produced cheap and good quality fabrics.
2. **After 18th century, power looms** came into use. In the **early years**, the cotton textile industry was **concentrated in the cotton growing belt of Maharashtra and Gujarat**. Availability of raw cotton, market, transport including accessible port facilities, labour, moist climate, etc. contributed towards its localisation.
3. While **spinning continues to be centralised** in Maharashtra, Gujarat and Tamil Nadu, **weaving is highly decentralised** to provide scope for incorporating traditional skills and designs of weaving in cotton, silk, zari, embroidery, etc.
4. India has **world class production in spinning**, but **weaving supplies low quality** of fabric as it cannot use much of the high quality yarn produced in the country. There are some large and **modern factories in weaving**, but most of the production is in fragmented small units, which cater to the local market. This mismatch is a major drawback for the industry.
5. **Cotton is a pure raw material** which does not lose weight in the manufacturing process. So, **other factors** like, power to drive the looms, **labour, capital or market** may **determine the location** of the industry. At present the trend is to locate the industry at or **close to markets**, as it is the market that decides what kind of cloth is to be produced. Also the

market for the finished products is extremely variable, therefore, it becomes important to locate the mills close to the market.

6. After the first mills were set up in Mumbai and Ahmedabad in the second half of the nineteenth century, the cotton textile industry expanded very rapidly. The number of units increased dramatically. The Swadeshi movement gave a major impetus to the industry as there was a call for boycotting all British made goods in favour of Indian goods.
7. After 1921, with the development of the railway network other cotton textile centres expanded rapidly. In southern India, mills were set up at Coimbatore, Madurai and Bangalore. In central India, Nagpur, Indore, Solapur and Vadodara became cotton textile centres. Cotton textile mills were set up at Kanpur based on local investment. Mills were also set up at Kolkata due to its port facilities.
8. The development of hydro electricity also favoured the location of the cotton textile mills away from the cotton producing areas. The rapid development of this industry in Tamil Nadu is the result of the abundant availability of hydel power for the cotton mills.
9. Thus, the cotton textile industry is located in almost every state in India, where one or more of the locational factors have been favourable. The importance of raw materials has given way to market or to a cheaper labour or may be power availability.

10. Factors

1. Cotton as a raw material is lightweight, non-perishable and hardly any weight loss when converted to textile. Therefore, proximity to raw material site is not essential, doesn't offer great cost saving in transportation.
2. So, other factors such as nearness to market and waterbody, energy to run power looms and textile machines, cheap labour supply, availability of capital become more important in industrial location.
3. In dry climate, the cotton threads will break quickly during spinning. So, not good for mass production as machines need to be stopped for joining broken threads.
4. On the other hand in humid climate thread will rarely break. So, cotton textiles were setup near costal areas (Mumbai, Osaka, Lancashire). Today we've humidifiers that can artificially increase the air-moisture in factory.

11. Problems of the cotton textile industry

1. There is **shortage of raw material** especially of good quality cotton to meet the growing demand of the Indian textile industry. **Cotton is imported from Egypt**, Sudan Kenya, Peru, Tanzania, Uganda, and USA. There is a need of **silver revolution**.
2. Most of the Indian textile mills are **working with obsolete machinery**. 70 percent of the spindles are more than 30 years of age. The **outdated machinery cannot compete** with the machinery of countries like China, Japan, etc.
3. **Power supply** to most of the factories is inadequate and erratic which adversely affects the production of goods.
4. An important factor for the **growing sickness** of the mill sector is the **growth of the decentralised sector**. Being a small scale sector, the Government allowed excise concessions and other privileges. These accompanied with low wages have led to low cost of production in the decentralised sector.
5. The high rate of **duty on imported cotton** has increased the cost of production of clothes which has created problems in selling the cloth in the international market.
6. **Competition from synthetic fibres** also poses problems to cotton textile industry. The poor people of the country **prefer to use synthetic fibre clothes** which are more durable and attractive.

12. Why Osaka in Japan developed

1. It is an **important textile centre of Japan**, also known as the Manchester of Japan. The textile industry developed in Osaka due to several geographical factors.
2. The **extensive plain around Osaka** ensured that land was easily available for the growth of cotton mills.
3. Warm **humid climate** is well suited to spinning and weaving.
4. The **river Yodo provides sufficient water** for mills.
5. Availability of **cheap labour**.
6. **Location of port facilitates** import of raw cotton and for exporting textiles. The textile industry at Osaka depends completely upon imported raw materials. Cotton is imported from Egypt, India, China and USA.
7. The **finished product is mostly exported** and has a good market due to good quality and low price.
8. Though it is one of the important textile cities in the country, of

late, the **cotton textile industry of Osaka** has been replaced by other industries.

13. Why did Gandhi lay emphasis on Khadi

1. To **boycott foreign made cloth** as a means of protest.
2. To develop a sense of nationalism among the people and **develop khadi as a symbol** of national unity and national fight.
3. To give **employment** to a large number of people who were unemployed.
4. To promote cloth making as a cottage industry and develop **village industry**.
5. Most importantly, it showed Indians how to be **self-reliant**.

Jute industry

1. India is the largest producer of raw jute and jute goods and stands at second place as an exporter after Bangladesh. There are about 70 jute mills in India. Most of these are located in **West Bengal**, mainly along the banks of the River Hugli.

2. Hugli basin

1. **Proximity of the jute producing areas** such in West Bengal and in Bangladesh.
2. Inexpensive **water transport**, supported by a good network of railways, roadways and waterways to facilitate movement of raw material to the mills.
3. There is **abundant water** for processing raw jute.
4. **Availability of cheap labour** from West Bengal and adjoining states of Bihar, Orissa and Uttar Pradesh.
5. **Kolkata** as a large urban centre provides banking, insurance and port facilities for export of jute goods.

3. Challenges

1. **Wage rates** need to be linked with productivity, new sophisticated machinery needed, but **labour unions** resistant. So, businessmen not doing new investment.
2. After **partition** jute producing areas went to Bangladesh. So Bangladeshis are now using more modern machineries than while we're still using outdated technology. Hence Bangladeshi jute products are better and cheaper than ours in International market.
3. **Competition from synthetic packaging material**.
4. **Lack of marketing strategy** to promote jute as eco-friendly, **bio-degradable packing** material among **environmentally conscious** customers in US and

Europe. However, the internal demand has been on the increase due to the Government policy of mandatory use of jute packaging.

5. To stimulate demand, the **products need to be diversified**. In 2005, National **Jute Policy** was formulated with the objective of increasing productivity, improving quality, ensuring good prices to the jute farmers and enhancing the yield per hectare.

Wool industry

1. Why do Southern Hemisphere lead in Wool production

1. Damper, cooler condition in the temperate areas of the Northern Hemisphere is not good for wool production. **Dry, warm climates of southern hemisphere** provide better conditions for wool production. Ex: Interior Australia, South Africa and the rain shadow area of Patagonia in Argentina.

2. **Australia is a dry continent, so large scale agriculture is not possible** anyways. Sheep can survive in bad climatic conditions. Therefore, sheep rearing provides the best economic use of the land for the farmers.

3. In Australia, **sheep rearing is done on a large scale**, so lower cost of production. This enables wool producers from southern hemisphere to compete with Indian, European or North American producers despite the added cost of transporting wool from South to North hemisphere.

4. Australia leads in wool production, but not in finished woollen textiles. Because, **woollen textiles have target audience** in colder northern countries and Australia's own local market is small. Cost of labour is also high in Australia because of low population. Woollen textile business require skilled workers.

2. Wool business in India

1. Wool is non-perishable and lightweight. **Indian wool is coarse**, so irritates body. If you **want to make decent apparels**, you have import from Australia.. Even to produce decent Carpets, blankets, you've to mix it with New Zealand's wool. Hence location of woollen textile **not tied to raw material site**.

2. **Winter in North India is brutally cold**. So, wool has good demand. 75% of industries concentrated in Northern States because of market factor. **Parallel to wool market factor**, you can see that Cotton textile industry is profound in southern half of India because warm humid climate. So, more demand for Cotton garments than woollen.

Chemical Industry

1. The chemical industry is among the established **traditional sectors** of our country that plays an integral role in our **economic development**. This sector forms a part of the basic goods industry and is a critical input for industrial and agricultural development. It accounts for about **2.11 percent of GDP**. The industry comprises both small scale and large units.

2. Chemical industry as a driver

1. It supplies **raw material to several industries** such as iron and steel, textiles, paper, synthetic fibres, rubber, plastics, paints, soaps, detergents, fertilisers, pharmaceutical, pesticides and dyestuffs.
2. Chemicals are also used in many industries to **improve or preserve the quality** of non-durable and durable goods.
3. **Advanced researches** like **bio-engineering**, **mutation**, artificial human organ production and genetic-reengineering are made possible in India, only with the help of the proper chemical industries. To make **pharmaceutical industry** more **competitive**, we need consistent and quality supply of chemicals.
4. A well developed and competitive chemical industry will lead to cheaper and better **fertilisers**, pesticides and seeds to farmers, enhancing viability of the agriculture sector.

3. Potential

1. The Indian chemical sector accounts for **13-14% of total exports** and 8-9% of total imports of India. Though itself not rich in raw materials like phosphate and sulphur, India's **proximity to the Middle East** makes for economies of scale.
2. Growing **disposable incomes** and increasing urbanisation are fuelling the end consumption demand for **paints, textiles, adhesives and construction**, which, in turn, leads to substantial growth opportunity for chemicals companies.
3. **Chemical sector is delicensed** except for few hazardous chemicals.
4. India's growing **demand for agriculture related chemicals** offers huge scope of growth for the sector in the future.
5. **There is a global demand** for Indian chemical products due to their high quality and competitive pricing. India's expertise in developing low cost yet high end chemical products is the key growth driver for Indian chemical exports.
6. There are **good opportunities in segments** such as **speciality chemicals, speciality polymers**, for catering to huge emerging

domestic demand as also as a manufacturing hub.

4. Why are inorganic chemical industries spread across country

1. Some chemical industries produce products that are **closely associated with other industries**. It is more efficient for these industries to be located near each other. For example a factory that produces **refrigerants** near a factory that produces **air conditioners** and refrigerators.
2. **Raw material for it are of light weight**, so can be easily transported.
3. Some chemical industries require certain inputs (feedstocks), it is sometimes more efficient for these to be **located close to where the raw materials** are produced or extracted.
4. **Some industries are more polluting** than others and must be located far from **residential areas**, others are not very polluting and can be located inside cities. There may also be safety issues.
5. **A highly profitable plant** with a smaller footprint can easily be located within a city. One that produces products in bulk and requires a very large land area may be more economical to locate in a remote area where land is cheap.

5. Why the organic chemical industries are located near oil refineries

1. The organic chemical industries get their **raw materials from byproducts of mineral oil** which is processed and refined at oil refineries therefore these industries are located near oil refineries.
2. Also, **organic chemicals cannot be transported** over long distance and need to be consumed urgently.

Cement industry

1. **Cement is essential for construction activity**. This industry requires bulky and heavy raw materials like **limestone, silica, alumina** and **gypsum**. Coal and electric power are needed apart from rail transportation. The industry has strategically located plants in Gujarat that have suitable access to the market in the Gulf countries.
2. **Factors affecting distribution of cement industry**
 1. **Cement industry** requires **low value but heavy materials** and mainly a raw material oriented industry. On an average 1.5 tonne of **limestone** is required to produce one tonne of cement. As the

northern plains are devoid of the limestone deposits, this region is devoid of this industry.

2. Along the Vindhyan ranges from **eastern Rajasthan to Jharkhand**, there is the abundant supply of quality limestone. As a result, many factories are found in **MP, Chhattisgarh, AP, Rajasthan, Gujarat, TN, KT and Bihar**.
3. The **transport cost is also reduced** if the manufacturing plant is located near the market.
4. Some other factors for the growth of this industry include, **labour availability, energy source** availability, **water** availability etc.
5. Thus, **availability of raw materials**, bulk transport facilities with least distance to the ready market are three fundamental factors that favour the growth of cement industry in India.

3. Growth of cement industry in India

1. The **first attempt of cement manufacturing was done in Chennai in 1904** where sea shells were used as raw material. But this attempt failed and successful cement manufacturing began with setting up of Indian Cement Company plant at Porbandar in 1912-13.
2. **The major turning point** in the growth of this industry was witnessed when **10 existing Indian cement companies merged** into one as Associated Cement Co. Ltd. (ACC) in 1924. At the same time, Dalmiya Cement group was also formed in 1937.
3. After **independence** with focus on massive **building programmes** the demand for cement rose dramatically. Gradually in 1980s, **India achieved self sufficiency** in cement production with partial decontrol of this industry. Subsequently with **complete decontrol** of this industry in 1990s and implementation of LPG reforms, helped this industry to grow exponentially.
4. **Concept of mini cement plants** is implemented in 1979 to exploit scattered limestone deposits.

4. Why the cement industry is concentrated in Gujarat

1. Bulky and heavy raw materials like **limestone, silica, alumina and gypsum** which are needed for the industry are readily available in Gujarat.
2. **Coal and electric power** are needed as source of energy. **Gujarat has suitable access** to the market in the Gulf countries for the export of cement.

Automobile industry

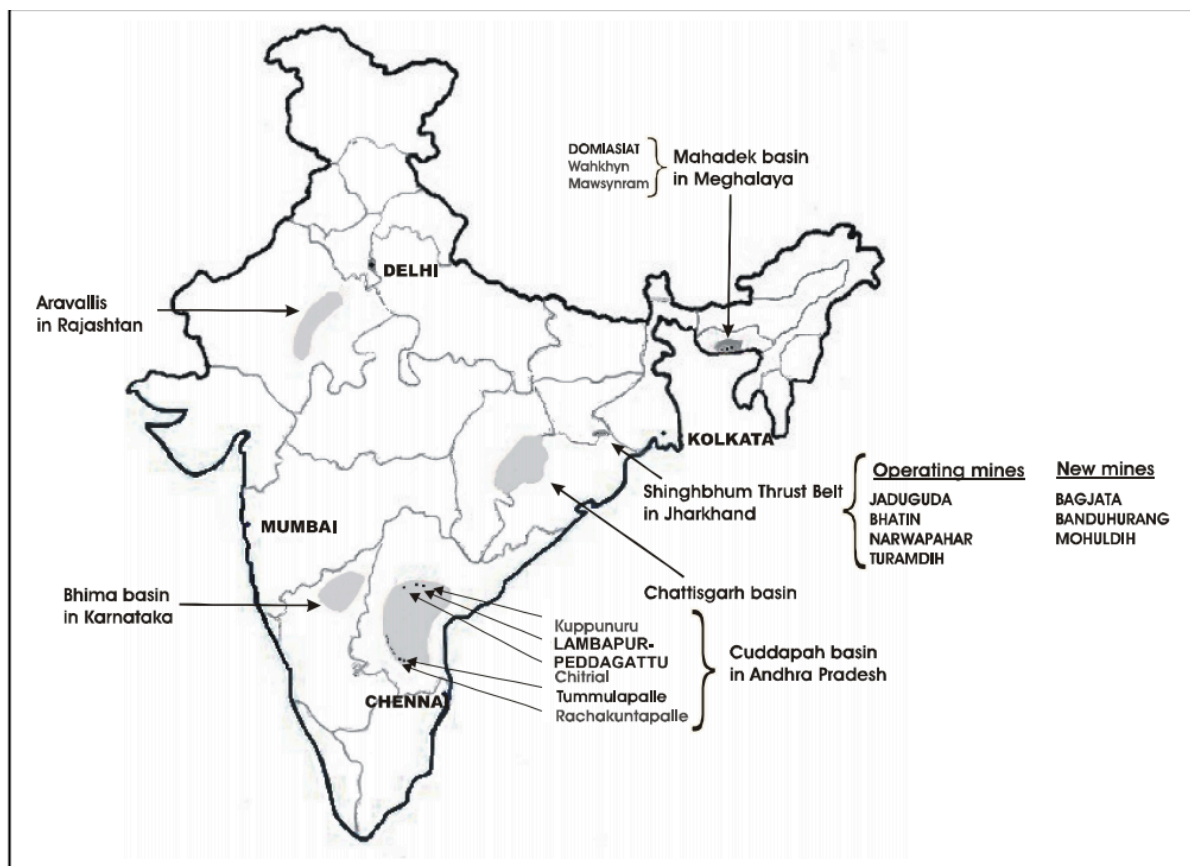
1. Automobile industry **requires large variety of raw materials** from other industrial sources namely **steel**, non-ferrous metals, **window glass**, plastic, rubber, wood, paint, textile, electronic cables, seat cushions etc. Therefore, **best location** for automobile industry is the **established industrial region** that has tradition of manufacturing such components.
2. **Traditional large-scale industrial regions:** These are based on heavy industry, often located near coal-fields and engaged in metal smelting, heavy engineering, chemical manufacture or textile production. These industries are now known as smokestack industries.
3. **Traditional industrial regions can be recognised by**
 1. **High proportion of employment** in manufacturing industry. High-density housing, often of inferior type, and poor services. Unattractive environment, for example, pollution, waste heaps, and so on.
 2. Problems of **unemployment**, **emigration** and derelict land areas caused by closure of factories because of a worldwide fall in demand.
4. **Advantages in India**
 1. **Raw material such as steel, electricity**, tyres are available in India. Ex: Chennai automobile sector is located near Salem steel plant.
 2. India has presence of **both cheap skilled as well as unskilled labour**. Ex: Automobile center at Delhi and Mumbai because of presence of cheap skilled labour.
 3. **Availability of ports helps** in import of machinery part and **export of final product**. Ex: Mumbai and Chennai port location make them favourable position for industry.
 4. India has **ready market for automobile industry** especially metro cities like Delhi, Mumbai due to factors such as rise in **purchasing power**, concerns of safety, Poor public transport, etc.
 5. **Government policy for 100% FDI** through automatic route, testing labs, tax benefits are boon for the sector.
 6. India's **strategic location in Indian ocean** with accessibility towards east Asia as well as Middle east and Africa is boon for India.

7. Domestic industry expanded with larger **technological breakthroughs**. Ex: **Fuel efficient kappa engine by Hyundai**.
8. However there are some issues like delay in constructing **dedicated freight** corridors, interrupted power supply, increased bank rate which need to be overcome to further increase growth of automobile sector and make Indian campaign Make in India great success.

Rare Earth metals

1. A rare earth element (REE) or rare earth metal is **set of seventeen chemical elements** in the periodic table, specifically the **fifteen lanthanides**, as well as scandium and yttrium. They **occur commonly in earth's crust**. They are used in many commercial applications including **new energy** technologies, **electronic** devices, **automobiles** and national **security** application.
2. These elements provide reduced **weight**, **reduced emissions**, **greater efficiency**, **durability**, and **thermal stability** to devices. They are used in **illuminated screens** of devices, in glass polishing, **petroleum refining**, **pollution control**, as catalysts, and in **defence equipments** such as precision weapons and **night vision** goggles.
3. They are **not rare** but occur together in **small quantities** which makes their **extraction difficult** and economically **unviable**. **Many of the REEs are hazardous to extract** due to their radioactive nature. Globally **China** is the leader in extraction of Rare Earth Elements. Other areas include Australia, Brazil, Canada, South Africa, Tanzania, Greenland, and the United States.
4. India has **3% of world reserves**. The primary mineral from which they are extracted is **Monazite** which is found in the form of sand on beaches of **Kerala**. India's emergence as a supplier, though a small one, has been a good news for countries like Japan, which up to now have had to rely mostly on China for rare earths production.

Uranium in India



Major uranium provinces of India

1

Software industry

1. **Silicon valley** refers to the southern portion of the **San Francisco Bay Area**, which is located in the US state of **California**. It is home to many of the world's largest high **tech corporations**, as well as thousands of **startup companies**. The core industry of the region is the fabrication industry, which includes **design and development of silicon computer chips**.
2. **Factors responsible for the growth of silicon valley**
 1. **Economic factors:** The fabrication industry developed here initially due to economic factors such as **cheap availability of land**. This was later aided by availability of **large skilled work force** and **agglomeration** effect.
 2. **Investors:** Availability of **large pool of investors** in California to provide seed capital to budding entrepreneurs.
 3. **Infrastructure:** The state has two of the world's **best universities**

like **Stanford and University of California**.

4. **Government policies:** State of California has one of the most business friendly legal atmospheres. It is **very easy** to set up a **new business** there.
 5. **Weather:** Its location near the mountains in tropical regions makes the **weather pleasant** and conducive for maximum productivity.
 6. **Migration:** It also benefited greatly from the **migration** of Americans, especially veterans, west to California and into the new jobs in aerospace and electronics.
3. **Why IT is concentrated in Bangalore**
1. The **seeds for IT have been laid by Patni, Infosys and Texas** instruments setting up their offices in Bangalore.
 2. Bangalore has one of the **best climate** in the country throughout the year. It is not too hot in summer, pleasant in winter. So it naturally attracted companies as well as people to settle over there.
 3. The **State government** also offered adequate incentives to investors. In 1970s itself a **large chunk of land** was kept for IT industry. The state government of Karnataka was the first to announce an IT Policy in 1992.
 4. Bangalore had highest **internet connectivity** in India among all other cities. So, it has guaranteed connectivity to the world at all the time.
 5. Bangalore was always a great **education hub**. Bangalore has the **largest number of educational institutions** and **IT colleges** in India. The local population were relatively well read in Bangalore. Bangalore in 70s and 80s used to **attract people** from **all over the world** for its educational institutions.
 6. Bangalore was a highly **cosmopolitan area** even before it became the IT capital of the country. Even in the 70s and 80s, one could speak almost any South Indian language on the streets and people would respond. The same with Hindi and English too.

Timber industry

1. Geographical industry

1. **Raw material:** Significant weight loss occurs when logs are processed. Therefore most pulp mill and saw mills are located near the jungles to reduce the cost of transporting waste matter.
2. **River:** As logs are bulky and difficult to transport via road. Rivers provide cheap and convenient mode of transport. Ex: Myanmar, the teak logs are floated down the Irrawady river upto Yangon and then exported. The paper/pulp mills require clean water free from chemical/pollutants.

2. Canada leads

1. **Raw material:** It has softwood which is easy to chop. Also, in coniferous forests, trees of same species are concentrated in one particular area. So, mass exploitation easier compared to tropical areas.
2. **Transport:** During winter, jungle surface is covered with snow. So, slippery surface provides easier to move logs to rivers. The forests are less dense than in tropical areas. So, they are easy to access.
3. **Labour:** As winter season in Canada is long, agricultural activities are limited which provide adequate labour for lumbering. Lumbering is highly mechanised with the help of chainsaws, bulldozers, etc.
4. **Market:** These forests are close to economically developed regions, where demand for wood is higher. Ex: USA for newsprint paper.

3. Challenges in Tropical areas

1. In tropical areas some tree species are extremely valuable, but they are not available in single pure strand. Lack of density of the species increases the cost of gathering.
2. In Amazon and Zaire basin, some trees are so heavy, it is difficult to float logs. This again increases transportation charges.
3. Settlement is sparse, economies are non-industrialised and are away from demand areas (Ex: Africa).
4. Road construction is also difficult because of thick vegetation.
5. Because of lax regulations and slash and burn type agriculture, jungles are permanently destroyed.

4. Opportunities in Temperate areas

1. **Trees of same species are concentrated** in a particular area. So, it is easy to exploit on commercial scale.
2. **Frozen ground** helps transporting logs from jungle/hills up to rivers.
3. **Softwood**, present in temperate areas, is easy to float down the river streams.
4. **Economies of the countries are industrialised** and are also near market.
5. **Replantation programs**, silviculture, strict government regulation on lumbering make jungles regenerate faster and lumbering becomes sustainable.

Pharmaceutical industry

1. In **initial years** of setting up the Indian Pharma industry was **located mainly at ports** as India was largely **importing bulk drugs and processing them further into the drugs for retail** in market. Thus the location of industry was mostly **restricted to large cities** such as Mumbai, Kolkata, etc.
2. In recent times as the country has **developed skilled work force** and also increased **domestic demand** has now shifted to the **locations near cities and metropolitan centers**. The largest cluster of pharma industry being setup around cities such as **Jaipur, Hyderabad, Pune, Delhi etc**. This industry thus has acquired **market orientation** in last few years. Even the **emergence of PPP model** in pharma industry has helped in the **evolution of pharma industry** in the large metropolitan centers.
3. Additionally, Pharma industry has also established a large **presence in the hilly areas** of the country because of **large incentives** which have been provided to this industry by the respective **state governments** for example Uttarakhand and Himachal Pradesh.
4. **Popularity of alternative medicine system** has also added further impetus to the shifting of pharma industry towards the hilly regions of the country. Also, hilly regions provide **pollution free** environment and relatively **cold climate**.
5. **Prospects of pharma industry in India**
 1. India's **population is growing rapidly**, as is its economy creating a large middle-class able to afford modern medicines.

2. India is one of the largest suppliers of **generic drugs** in the world and this sector has large amount of untapped potential globally.
3. India also has a vast **pool of trained pharmaceutical scientists, doctors and researchers**.
4. India's population is **ageing**, so demand is likely to increase for **drugs for cardiovascular problems**, disorders of the central **nervous system** and other **chronic diseases** such as diabetes which is increasing at an alarming rate.
5. The ascendancy of India's **medical tourism** in recent years also has encouraged a number of **international pharmaceutical** companies to invest in India, this has led to large scale collaboration between Indian and foreign pharmaceutical companies.

6. Globalisation

1. **Access to world markets** has increased. Since 1980s, India has been **exporting more** medicines than it imports. About 30% of the drugs meeting the **requirements of the US generic** market is from India. Large market share for generic drugs was opened in LDCs like Africa.
2. **Pharma FDI** helped to boost the Indian economy and create gainful employment.
3. FDI also provided better **medical techniques**, innovations and led to improved domestic productivity and competitiveness. Merging with international farmers helped Indian industry.
4. India emerged as a hub of **medical tourism (\$2 billion)** which also boosted growth prospects of the industry.
5. A recent study shows that the **prices** of many life saving **bulk drugs have gone** up steeply because of the **WTO IPR** norms.
6. With the **reduction of the customs duties** on foreign imports many drugs manufactured in India have become **unviable** compared to the foreign goods in the Indian market.
7. **Large MNCs have nearly monopolised** the vital drug markets where there is scope for highly funded innovation.
8. **Mergers and acquisitions with Indian firms** (like SKB with Sterling) is further increasing the tendency towards monopolisation.

Petrochemical industry

1. Oil is extracted from the oil fields is in its crude form and contains many impurities. It is refined in oil refineries before use. After refining various products such as kerosene, diesel, petrol, lubricants, bitumen etc., are obtained.
2. Today approximately 22 oil refineries are working in India. Some of these places where they are located are Guwahati, Barauni, Koyali, Haldia, Mathura, Digboi, Panipat, Chennai, Mumbai, Kochi, Bina etc.
3. **Factors responsible**
 1. Petroleum refining does not lead to significant weight loss. Virtually all the by-products can be used. Therefore, refineries can be set up near the raw material or near the market or at an intermediate break of the bulk location.
 2. After refining, the finished petroleum products can be supplied to interior areas through pipeline connection and trucks. Ex: Barauni (Bihar), Mathura (UP), Panipat (Haryana).
 3. Many petrochemical complexes are located on the coast to facilitate imports. Ex: Reliance has setup a pipeline to directly transport crude oil from Sikka port to its Jamnagar refinery.
 4. The development of large tankers and pipelines made bulk transportation of petroleum possible. This provides favourable condition for locating refineries and petrochemical industries near the market and near the ports.
4. **Fertiliser industry**
 1. The localisation of fertilizer industry is closely related to petrochemicals. About 70% of the fertiliser plants producing nitrogenous fertilizer use Naphtha as the basic raw material.
 2. That is why, most of the fertilizer plants are located near the oil refineries. For example, oil and gas from Bombay High, the Gujarat-Maharashtra region got fertiliser plants at Hazira, Mumbai, Trombay, Vadodara etc.
 3. However, some fertilizer plants draw their feed stock from steel slug as well as coke and lignite. Sulphur is another important mineral used for manufacturing fertilisers available in Tamil Nadu.
 4. During the recent year transportation of Naphtha or gas through rail or pipelines has facilitated the widespread distribution of

fertiliser plants with priority to sea board location. Ex: Vijaypur,
Jagdishpur.