Classification of Industries

Bases & Characteristics

By: Urmi Sharma

Classification of Industries

Bases:

1. Raw-Material and Finished Goods
2. Orientation (Riley's classification)
3. Size
4. Authority or Ownership
5. Resources

Raw-Material and Finished Goods

1. **Heavy Industries:**

- ✓ Use **heavy** and **bulky raw-materials** and produce products of the same category
- ✓ aka '**Base industries**'
- ✓ Products of these industries are used as raw material or input for various other industries.
- ✓ Eg: Iron & Steel Industry, Cement

2. **Light Industries:**

- ✓ Use **light** raw-materials and produce **light** finished products

  Eg: Paper industry, Utensils, Plastic, Electric fans, sewing machines, Watch, Textile etc.

Orientation: Locational attraction of areas

1. **Raw Material:**

- ✓ Industries are located in the proximity of sources of raw material
- ✓ Product loose huge weight after manufacturing.
- ✓ Eg: Copper, Cement, Sugar, Paper-Pulp, Zinc

2. **Power :**

- ✓ Huge amount of energy is required in industrial process
- ✓ Plants are located near availability of source of energy
- ✓ Eg: Textile industry, Aluminium Industry

Orientation cont.

3. **Market:**

- ✓ Market mainly attracts industry when the industrial product **gains weight** in the manufacturing process.
- ✓ Locating near market (area of demand) also saves **transport costs** to be charged for the **greater weight** and **value**.
- ✓ Eg: Furniture, Automobiles,

4. **Multi-Locational:**

- ✓ Locational decisions are not just determined by single factor. (Multiple factors are involved)
- ✓ Steel Industry, Oil refinery, Aluminium

5. Footloose:

- ✓ Such industries are **independent to choose their location**.
- ✓ They are not affected by any of the locational factors discussed earlier. WHY?????
- ✓ **These industries often have spatially fixed costs, i.e. the costs of the product do not change despite where the product is assembled.**
- ✓ Main reason: Technological advancement
- ✓ **Examples:**
  - Silicon Valley (California),
  - IT Industry (Bengaluru, Mumbai, Pune, etc.)
  - Automobiles
  - Electronic Products
  - Airplane Tools
  - Plastic
  - Artificial Rubber
  - Shoe Industry
  - Diamonds
  - Railway Engineering
  - Computers
  - Telecommunication tools
  - Machinery parts
  - Mobile manufacturing

SiZe

- ✓ Size parameters:
  1. Amount of **Capital** involved
  2. Number of **Workers** (Labor)
  3. Amount of **Production**
  4. Use of **Technology**

1. **Cottage:**

- Industries which artisans set up in their own houses
- Do not use machines
- Production scale is very low
- Product is mainly consumed locally.
- Eg: Handicrafts, Handloom, khadi and leather work

2. **Small-scale:**

- Production levels are small
- Requires low capital investment
- Use of machines but at small scale
- Eg: Cycle industry, radio and television industries

3. **Large-scale:**

- Production in 'bulk' along with use of heavy machines
- Huge capital investment (by amount of capital and not weight in absolute terms)
- Eg: Iron & Steel, Cement, Copper, Aluminium
- Labor-intensive Eg.:Cotton or Jute textile industries.

Authority or Ownership

1. **Public**:

   Industries owned by the **state** and its agencies like **Bharat Heavy Electricals Ltd.**, or **Bhilai Steel Plant** or **Durgapur Steel Plant , Hindustan Aeronautics Limited (HAL)** are public sector industries.

2. **Private**:

   Industries owned by **individuals** or **firms** such as **Bajaj Auto** or **TISCO** situated at **Jamshedpur** are called private sector industries

3. **Joint**:

   Industries owned jointly by the **private** firms and the **state** or its agencies such as **Gujarat Alkalies Ltd.**, or **Oil India Ltd., Maruti Udyog.** fall in the group of joint sector industries.

4. **Cooperative sector industries: (to provide self-help to its members.....work from a totally non-profit perspective)**

   Cooperative industries are operated by the suppliers, producers or workers of raw material. Example, Amul India, Sugar mills

Resources

1. **Agro-based:**

   Agro based industries are those industries which obtain **raw-material from agriculture**. Cotton textile, jute textile, sugar and vegetable oil are representative industries of agro-based group of industries

2. **Mineral-based:**

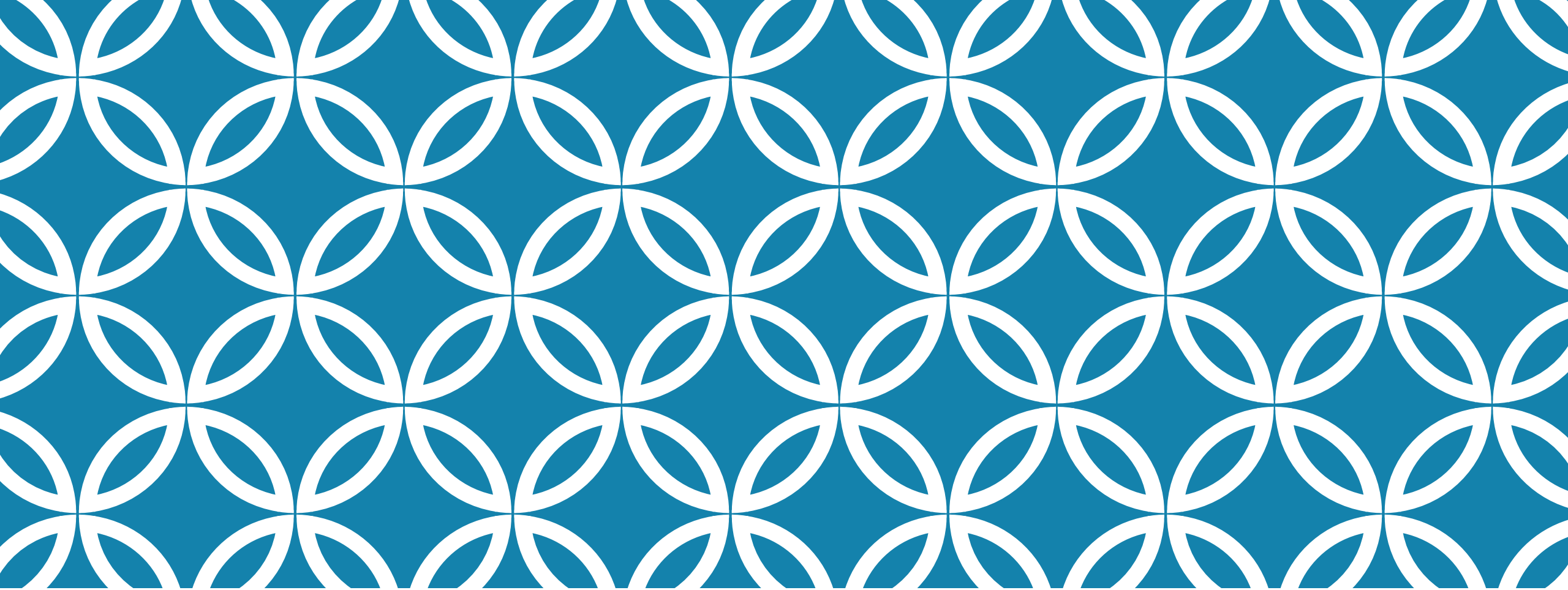
   The industries that receive raw materials primarily from minerals such as iron and steel, aluminium and cement industries fall in this category

3. **Pastoral-Based Industries:**

   These industries depend upon **animals for their raw material**. Hides, skins, bones, horns, shoes, dairy, etc. are some of the pastoral-based industries.

Renner's Classification (1947)

1. Extractive
2. Reproductive
3. Fabricative
4. Facilitative



INDUSTRIAL LINKAGES

- **Industrial linkage** can be broadly defined as **the contacts and flows of information and/or materials between two or more industrial sectors or firms.**
- The concept is widely used in industrial and economic geography **to portray interfirm interdependence**.
- Its geographical patterning is dependent on **transportation costs**, **development of telecommunication technology**, and **standardization of production**, as well as **political, institutional, and societal factors**.
- In some instances, industrial linkage is **reconceptualized as the operational manifestations of power relationships**, and as the spatial dimension inherent in all power networks.

1. Geographers argue that industrial linkages are still a **powerful sustainer of industrial agglomerations,** and thus have **fundamental impacts on firms' location/relocation decision-making.**
2. Their argument can be extended by **François Perroux's (1955) idea of "growth centers" or "growth poles"**, where **in a confined geographical area, a nexus of linked economic processes** for the mutual convenience and economic benefit are observed.
3. The last type of practical importance of industrial linkages is that material and information linkages also **serve to widen a firm's knowledge of space,** and this in turn **encourages and facilitates further spatial expansion** when needed.

4. **Agglomeration** is **when several firms choose the same area for their location** in order **to minimize their costs**.

- **Energy** savings
- Reduced transport costs
- Waste products from one industry forming a raw material for another
- Energy given off by one process being used elsewhere
- Division of Labor
- Economies of scale where several firms buy in bulk or share distribution costs
- Improved communications, services and financial investment
- Higher levels of skill and further research
- A stronger political bargaining position for government aid

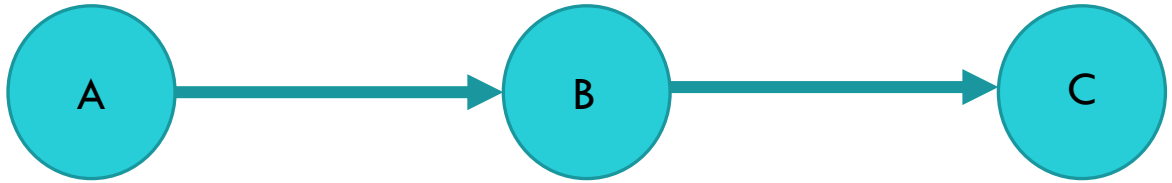
4. एकत्रीकरण तब होता है जब कई फर्म अपनी लागत को कम करने के लिए अपने स्थान के लिए एक ही क्षेत्र का चयन करती हैं।

- ऊर्जा की बचत
- परिवहन लागत में कमी
- एक उद्योग से दूसरे के लिए एक कच्चा माल बनाने वाले अपशिष्ट उत्पाद
- एक प्रक्रिया द्वारा दी गई ऊर्जा अन्यत्र उपयोग की जा रही है
- श्रम विभाजन
- पैमाने की अर्थव्यवस्थाएं जहां कई फर्म थोक या शेयर वितरण लागत में खरीदती हैं
- बेहतर संचार, सेवाएं और वित्तीय निवेश
- उच्च स्तर के कौशल और आगे के शोध
- सरकारी सहायता के लिए एक मजबूत राजनीतिक सौदेबाजी की स्थिति

- A firm's linkages can be divided into:

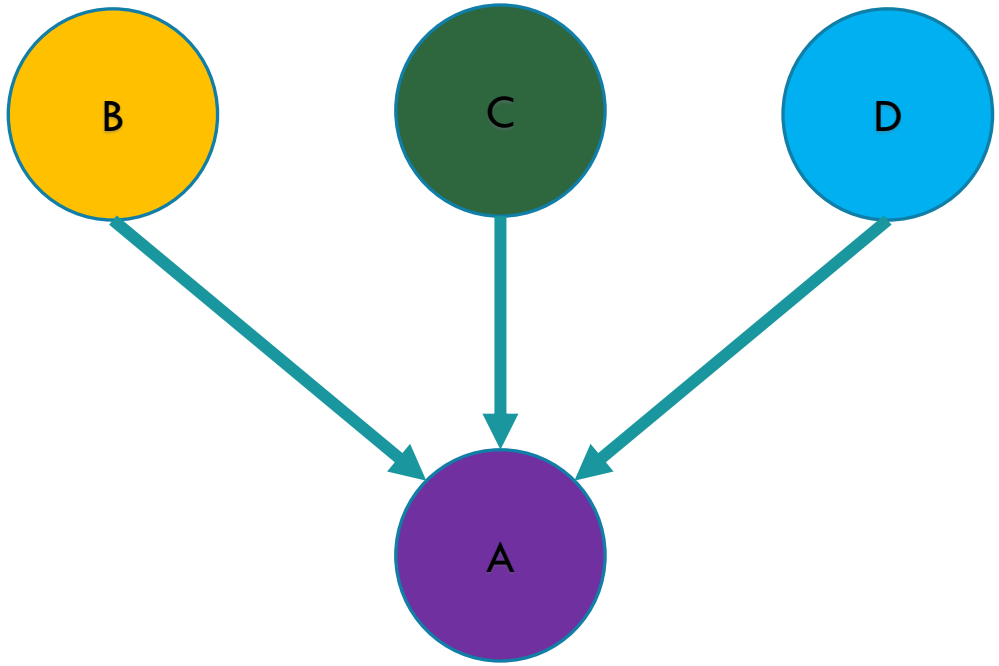
1. Vertical linkages (one-to-one)

   - a **simple chain**
   - **when the raw material goes through several successive process**
   - **Forward and backward linkages**
   - Eg: mill logging – pulp – newsprint



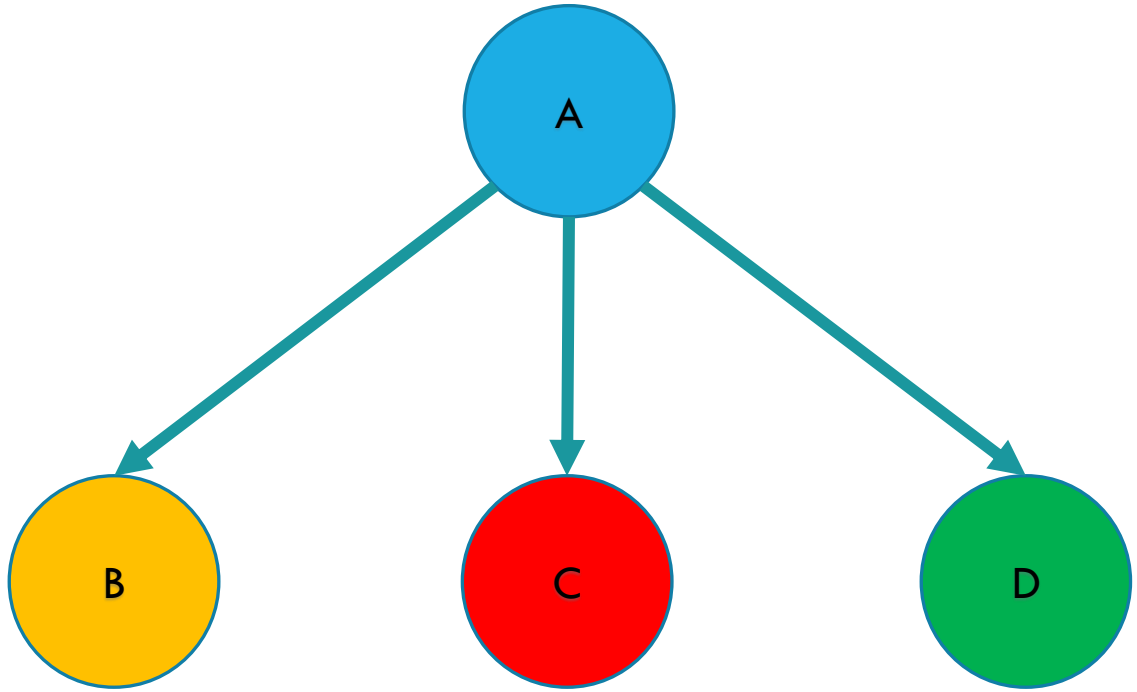
2. Horizontal linkages (many-to-one)

- multi origin
- **when an industry relies on several other industries to provide its component parts**
- Eg: brakes, gearboxes, electrical equipment, tyres, and radiators with car assembly plant



3. Diagonal linkages (one-to-many)

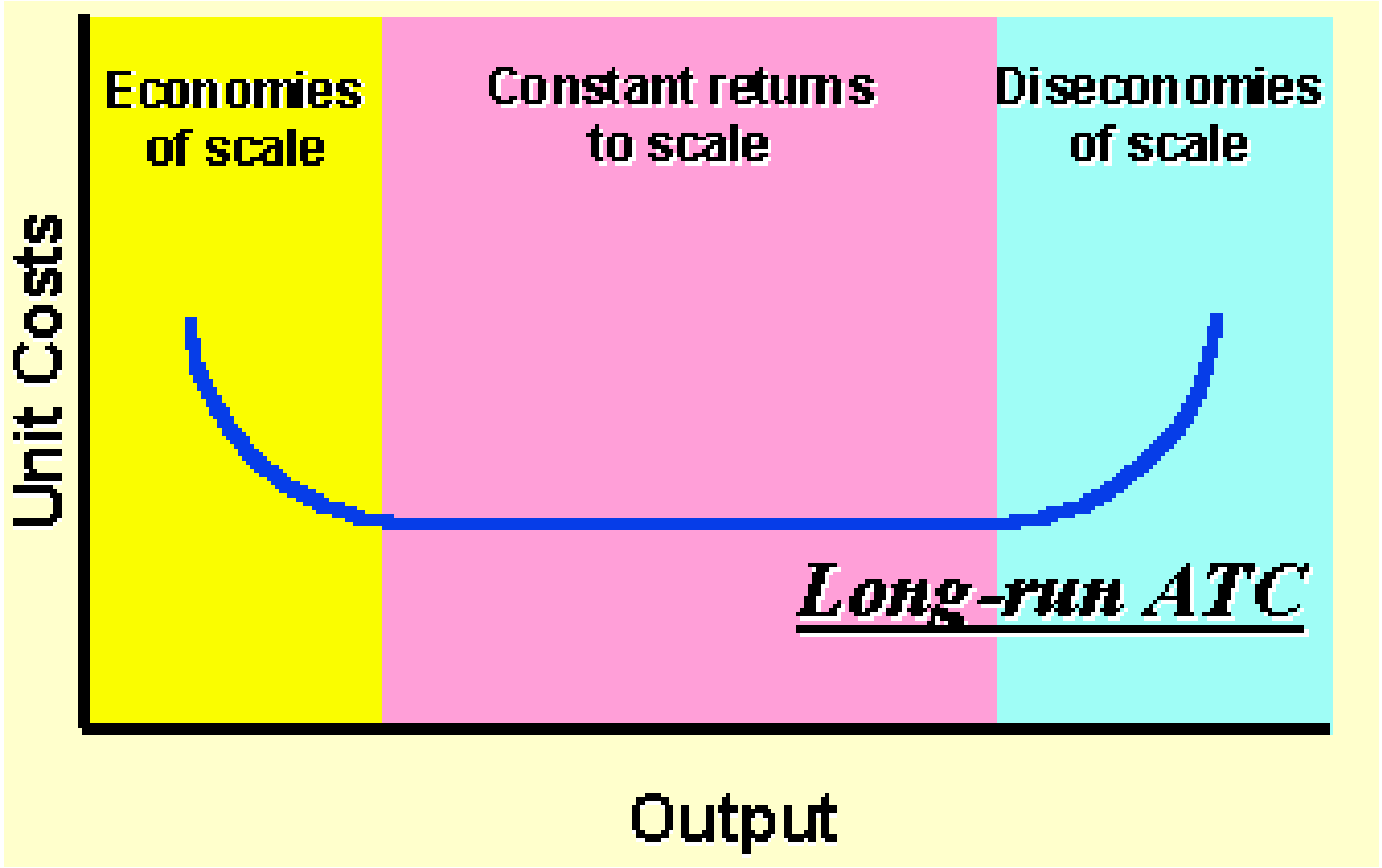
- multi-destination
- **when an industry makes a component which can be used subsequently in several industries**
- Eg: washers, nuts, and bolts with watches and clocks, car industry, domestic appliances, repair workshops/garages.



Economies of Scale

- In economics, **returns to scale** describes what happens when the **scale of production increases** over the **long run** when all **input levels are variable** (chosen by the firm).
- **Returns to scale** explains **how the rate of increase in production is related to the increase in inputs in the long run**.
- There are **three stages** in the returns to scale:
  1. Increasing returns to scale (IRS),
  2. Constant returns to scale (CRS), and
  3. Diminishing returns to scale (DRS).

Returns to scale vary between industries, but typically a firm will **have increasing returns to scale at low levels of production, decreasing returns to scale at high levels of production, and constant returns to scale at some point in the middle.**


Economies of scale
Constant returns to scale
Diseconomies of scale
Unit Costs
Long-run ATC
Output

Increasing Returns to Scale

The first stage, increasing returns to scale (IRS) refers to a production process where an **increase in the number of units produced** causes a **decrease in the average cost** of each unit.

In other words, a firm is experiencing IRS when the cost of producing an additional unit of output decreases as the volume of its production increases.

IRS may take place, for example, if the cost of production of a manufactured good would decrease with the increase in quantity produced due to the production materials being obtained at a cheaper price.

Constant Return to Scale

- The second stage, constant returns to scale (CRS) refers to a production process where an increase in the number of units produced causes no change in the average cost of each unit. If output changes proportionally with all the inputs, then there are constant returns to scale.

Diminishing Return to Scale

- The final stage, diminishing returns to scale (DRS) refers to production for which the average costs of output increase as the level of production increases. The DRS is the opposite of the IRS. DRS might occur if, for example, a furniture company was forced to import wood from further and further away as its operations increased.

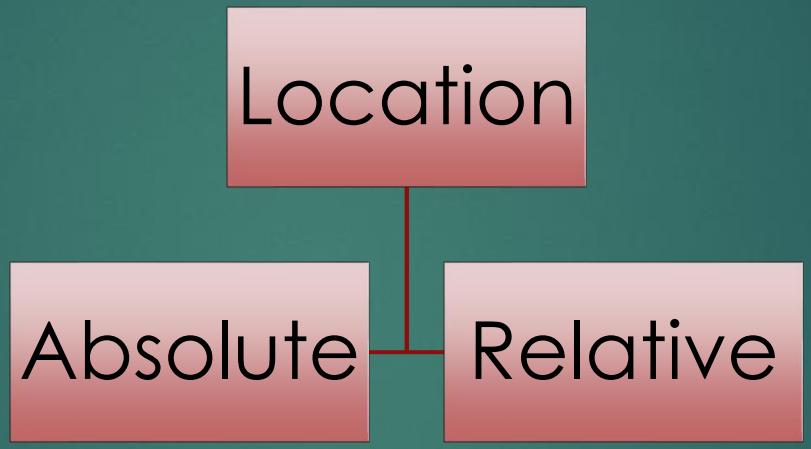
Elements and Factors of Localization of Industry

LOCATION OF INDUSTRY: "**WHERE**" & "**WHY THERE**"

- Theories are needed to **explain** the location of industry
- Theories are also needed to **predict** suitable locations for future developments.
- Our questions to be:
    1. Is the distribution of industries simply **random**?
    2. Or is it arranged in an **ordered** pattern?

- The locational decisions are taken within a framework of a set of conditions which limits the range of activity of manufacturers in some direction and encourages it in others.
- Conditions: Physical, Economic, Social & Political: ***Variables affecting location of industry***

Geographic location ????



- **Absolute Location: Latitude, Longitude**
- **Relative Location: Connection with other nearby places**

Approaches to the problem of Location of Industry:

1. By explaining why certain areas are attractive to industry

(Seeks to identify the advantages that the region offers)

कुछ क्षेत्र उद्योग के लिए आकर्षक क्यों हैं?

2. By explaining why certain industries are attracted to particular areas (**multi locational case**)

(Emphasize upon the explanation of the distribution of particular industries)

कुछ उद्योग विशेष क्षेत्रों की ओर ही क्यों आकर्षित होते हैं?

Factors affecting Location:

1. Geographical
   - Raw material
   - Power
   - Market
   - Labor
   - Transportation
   - Water

2. Non-Geographical
   - Political
   - Economic
   - Social
   - Historical

Geographical Factors:

1. Raw-material:

- Weight-losing industries: Jute mills, Sugar industry, Iron & Steel, Cement, Paper-Pulp
- Modem industry is so complex that a wide range of raw materials is necessary for its growth.
- Industries which use heavy and bulky raw materials in their primary stage in large quantities are usually located near the supply of the raw materials.
- **Reducing Importance: improved transportation, substitutes, use of semi-processed products, less wastage in manufacturing**

2. Source of Energy:

- Regular supply of power is a pre-requisite for the localization of industries.
- **Coal, mineral oil and hydro-electricity** are the three important conventional sources of power. ***Most of the industries tend to concentrate at the source of power.***
- The **iron and steel industry** which mainly depends on large quantities of coking coal as source of power are frequently tied to **coal fields**.
- Others like the el**ectro-metallurgical** and **electro-chemical industries**, which are great users of **cheap hydro-electric power**, are generally found in the areas of hydro-power production, for instance, Aluminium industry.

2. Source of Energy: …

- ***In recent times petroleum can be easily piped and electricity can be transmitted over long distances by wires, it is possible to disperse the industry over a larger area.***
- Thus, more than all other factors affecting the location of large and heavy industries, quite often they are established at a point which has the best economic advantage in obtaining power and raw materials.
- Eg. Electrochemical, Electrometallurgical, Aluminum
- **Mobility of Power has improved**
- **Alternatives sources**: Solar, Wind, Natural gas, Biomass
- Tata Iron and Steel Plant at Jamshedpur, the new Aluminium producing units at Korba (Chhattisgarh) and Renukoot (Uttar Pradesh), the copper smelting plant at Khetri (Rajasthan) and the fertilizer factory at Nangal (Punjab) are near the sources of power and raw material deposits, although other factors have also played their role.
- ***With the innovation of other sources of power like electricity, gas, oil, etc. the power factor became more flexible leading to dispersal and decentralization of industries.***

3. Market:

- Industry produce good for sale therefore nearness to market is essential for quick disposal of manufactured goods.
- **Concentration** of ***labour, power, money***, etc.

  Therefore, helps in reducing the transport cost and enables the consumer to get things at cheaper rates.
- It is becoming more and more true that industries are seeking locations as near as possible to their markets; it has been remarked that market attractions are now so great that a **market location is being increasingly regarded as the normal one**, and that a location elsewhere needs very strong justification.
- **Larger it is, greater the attraction it exerts.**
- **Type of Goods Produced: Weight-gaining industries, Fragility, Perishability, Large sized, Price of finished goods, Industry using ubiquitous raw material as input**

4. Labour:

- Availability
- Cost
- Skilled
- Mobility of Labour
- Management

- उपलब्धता
- लागत
- कुशल
- श्रम की गतिशीलता
- प्रबंध

4. Labour:…

- Labour supply is important in two respects

(a) workers in large numbers are often required,

(b) people with skill or technical expertise are needed

Estall and Buchanan showed in 1961 that labour costs can vary between **62 per cent** in **clothing** and related industries to **29** per cent in the **chemical** industry; in the fabricated **metal products** industries they work out at **43** per cent.

- Increasing mechanization: yet the light consumer goods and agro-based industries generally require a plentiful of labour supply.
- Adequate supply of cheap and skilled labour is necessary for industry. **The attraction of an industry towards labour centres depends on the ratio of labour cost to the total cost of production which Weber calls 'Labour cost of Index'.**
- The availability of skilled workers in the interior parts of Bombay region was one of the factors responsible for the initial concentration of cotton textile industry in the region.

5. Transportation:

- Locational attraction where ‘Transportation cost’ is minimum.
- Elements of transport cost:

I. **Operating Cost:** cost required to run and develop transportation facility

Line-Haul cost: costs which are incurred in the process of moving and which are made up principally of Fuel costs and Wages. **(Long haul advantage) (Break-of-Bulk) (Back-Haul cost)**

Overhead cost: represents the cost of equipment involved. (Ship, Railway, Shops, Offices)

Transfer cost: made up of indirect cost (Insurance cover)

II. Profit & Freight Rates:

- *Determinants of transport cost:*

i. **Distance**
ii. Type of **terrain** to be covered
iii. Means of **Transportation**
iv. Type of **commodity**
v. Degree of **competition** from other Carriers

6. Other:

- **Site and Services:** Existence of public utility services, cheapness of the value of the site, amenities attached to a particular site like level of ground, the nature of vegetation and location of allied activities influence the location of an industry to a certain extent.
- **Natural and Climatic Considerations:** Natural and climatic considerations include the level of ground, topography of a region, water facilities, drainage facilities, disposal of waste products, etc.
- These factors sometimes influence the location of industries.

For instance, in the case of **cotton textile industry**, **humid climate** provides an added advantage since the frequency of yarn breakage is low. The humid climate of Bombay in India and Manchester in Britain offered great scope for the development of cotton textile industry in those centres.

Non- Geographical factors

1. Capital:

- Modem industries are **capital-intensive** (पूंजी-गहन) and require **huge investments (**भारी निवेश**)**. Capitalists are available in urban centres.
- The availability of capital at **cheap rates of interests** and in **adequate amount is a dominating factor influencing industrial location.**

For instance, a review of locational history of Indian cotton textile industry indicates that concentration of the industry in and around Bombay in the early days was mainly due to the presence of rich and enterprising *Parsi* and *Bhatia* merchants, who supplied vast financial resources.

- Capital can be analyzed in two ways:
    a. ***Mobile***: Monetary capital मौद्रिक पूंजी
    b. ***Immobile***: Infrastructure (Geographical Implications) {Heavy Machines}
- Monetary capital is not so mobile beyond a country's borders. (Why??)
    1. Doubt in its return and safety
    2. Restrictions posed by the governments सरकारों द्वारा लगाए गए प्रतिबंध

2. Government Intervention सरकारी हस्तक्षेप :

- **Encourage & Restricts** प्रोत्साहित और प्रतिबंधित
- To ensure **optimum use (**अधिकतम उपयोग**) of country's available resource**
- To **decrease the regional inequalities (**क्षेत्रीय असमानताओं) in ***wealth*** and ***development***
- ***To release stress (pollution, heavy clustering) from big industrial and urban centres***
- **Strategic (**सामरिक**)decisions:** to move key industries to '**safe**' locations during war time
- In accordance to the regional planning policies aimed at reducing serious regional imbalances. **It is of relevance to examine the influence of India's Five Year plans on industrial location in the country. The emergence of suitable industries in south India around new nuclei of public sector plants and their dispersal to backward potential areas has taken place due to Government policies.**
- **We may conclude by noting that the traditional explanation of a location of industry at a geographically favorable point is no longer true. Location of oil refinery at Mathura, coach factory at Kapurthala and fertilizer plant at Jagdishpur are some of the results of government policies.**
- Development of **SEZ**
- **Tax structure** and economic **policies**

3. Human Factor:

- Decisions
- Innovations
- Prevailing Socio-economic system

3. मानव कारक:

- निर्णय
- नवाचार
- प्रचलित सामाजिक-आर्थिक व्यवस्था

Conclusion:

- The problems of finding the location of industry is complex.
- Locational factors are not operating in isolation but in combination
- The relative importance of these factors varies from ***time to time***, from ***area to area***, from ***industry to industry***, and within different types of ***economy***, making it **difficult to draw general conclusions**.
- **Not all the factors that have operated have been in favourable, and that most good locations have been those where the number of favourable factors have outweighed the unfavourable ones. (*किसका पलड़ा भारी है :P)***

The task of geographer is to discern the major trends out of this apparent chaos of reality.

भूगोलवेत्ता का कार्य इस वास्तविकता की अराजक परिस्तिथि में प्रमुख रुझानों को स्पष्ट करना है।

Centralization & Decentralization of Industry

उद्योग का केन्द्रीयकरण और विकेंद्रीकरण

Advantages of Localization:

1. **Firstly,** a localized product gains reputation and thus it becomes easy for a firm to find **good market** within and outside the country. On the basis of reputation, it is generally able to charge higher prices than the products of their counterparts situated elsewhere. For instance, the sports and leather goods manufactured in Sialkot have acquired very good commercial reputation and it is easy to sell them at good prices.
2. **Secondly,** when an industry is located in a particular region, it is easy to get **skilled labor** of the industry, industrial skill passes on from father to son.
3. **Thirdly,** localization leads to **promotion and growth of subsidiary industries** (ancillary industries).

Advantages of Localization…:

4. **Fourthly,** it results in the **development of specialized research institutions.**
5. **Fifthly,** it leads to the **spread of fast means of communication and transport.**
6. **Sixthly,** localization encourages the **development of financial facilities**. When banks and other financing cooperation find profitable field for investment in a locality, they at once open their branches there.
7. **Finally,** localization provides opportunities both for **workers** and the **industrialists** to understand each other and to form themselves into an **organization** in order to safeguard their respective interest.

Decentralization of Industries

उद्योगों का विकेंद्रीकरण

Pull factors:

- ✓ Improvement of Energy supply
- ✓ Technological improvements over use of raw-material
- ✓ Means of Transportation
- ✓ Strategic decisions
- ✓ Govt. policies to discourage regional imbalance in backward areas.

Pull factors:

- ✓ ऊर्जा आपूर्ति में सुधार
- ✓ कच्चे माल के उपयोग पर तकनीकी सुधार
- ✓ परिवहन के साधन
- ✓ रणनीतिक निर्णय
- ✓ सरकार। पिछड़े क्षेत्रों में क्षेत्रीय असंतुलन को हतोत्साहित करने की नीतियां।

Decentralization of Industries

उद्योगों का विकेंद्रीकरण

Push factors:

- ✓ Congestion
- ✓ Pollution

Push factors:

- ✓ भीड़-भाड़
- ✓ प्रदूषण

Geographical Inertia:

It is the stage at which an industry prefers to run in its former location although the main alluring factors are gone.

- **Industries don't move from an area, despite the locational disadvantages**
- **Raw material source are depleted**
- **Energy crisis has emerged**

- Capital immobility
- Secondary advantages: Economies of Localization
- Industry attracts industry: Concentrations and Linkages
- Environment: Climate

भौगोलिक जड़ता:

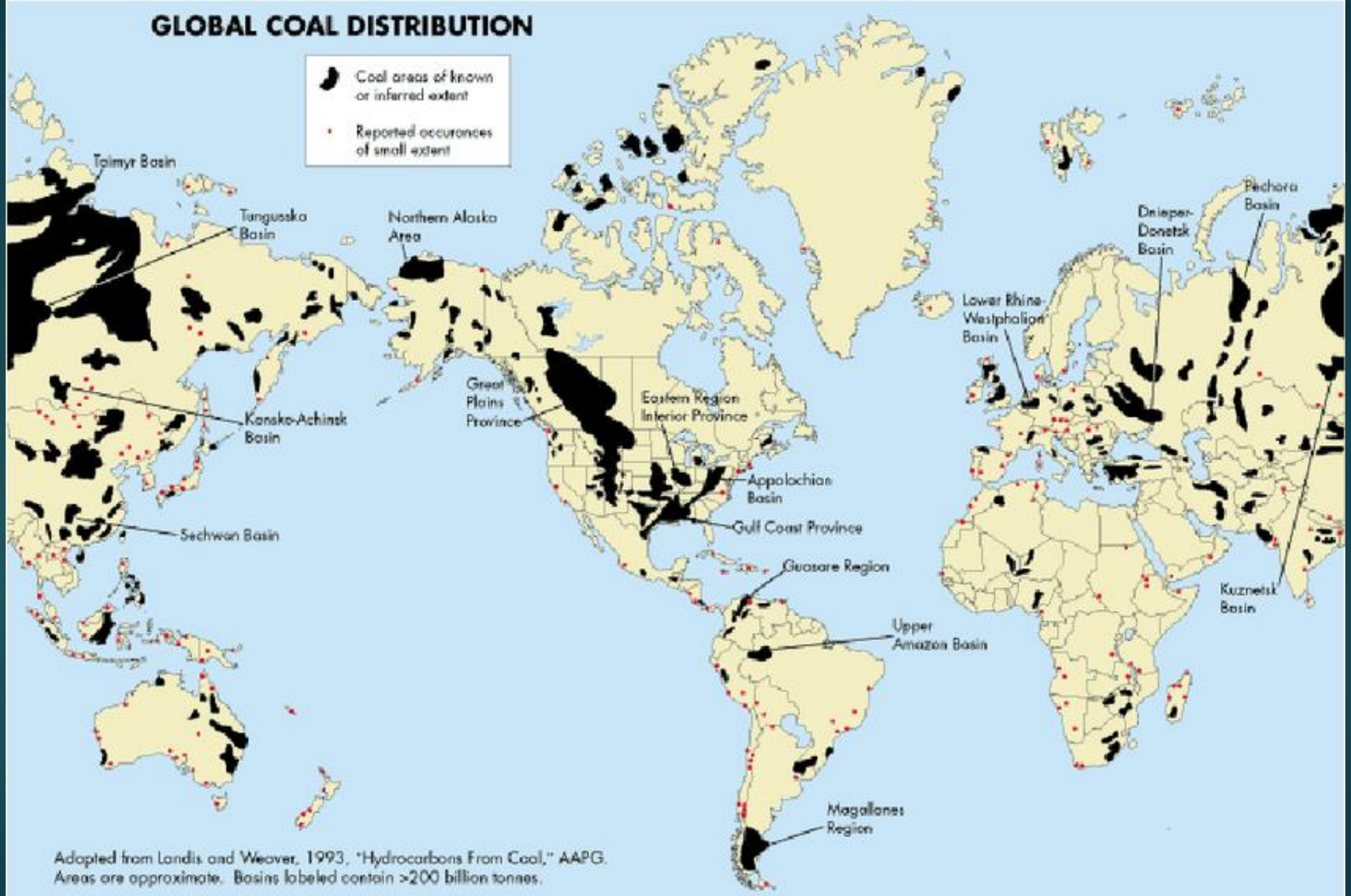
- यह वह चरण है जिस में एक उद्योग अपने पूर्व स्थान पर ही कार्य करना पसंद करता है, जबकि वहां अब मुख्य आकर्षक कारक नहीं रहे।
- स्थानीय नुकसान के बावजूद उद्योग एक क्षेत्र से नहीं चलते हैं
- कच्चे माल का स्रोत घट गया है
- ऊर्जा संकट सामने है
- पूंजी गतिहीनता
- द्वितीयक लाभ:स्थनीयकरण की अर्थव्यवस्थाएँ
- उद्योग उद्योग को आकर्षित करता है: एकाग्रता और संबंध
- पर्यावरण: जलवायु

Disadvantages of Localization:

1. **Demand decreases:** It is dangerous when the demand for the localized products declines due to the growth of **foreign competition** or due to the **changes in the tastes** of the people. In that case there will be mass unemployment in the particular localized industries.
2. Localization results in the **economic dependence of one region** on the other or of one, if the commodity demanded is one of the basic necessities of life, it can cause much inconvenience to the depending nations.
3. People are forced to get **specialized only one type** of work in a localized industry. If they wish to go to another place, they **may face difficulty in getting employment**.
4. During war, a localized industry can easily be made a target for bombardment and the whole industry can be ruined to ashes. So it is not wise to place all eggs in one basket. The industry should be decentralized. It should be spread out in various parts of the country so that it may not become an easy target for enemy's air attack.

Conclusion:

- The problems of finding the location of industry is complex.
- Locational factors are not operating in **isolation** but in combination.
- The relative importance of these factors varies from **time to time**, from **area to area**, from **industry to industry**, and within different **types of economy**, making it difficult to draw general conclusions.
- Not all the factors that have operated have been in favourable, and that most good locations have been those where the number of favourable factors have outweighed the unfavourable ones.
- The task of geographer is to discern the major trends out of this apparent chaos of reality.
- In reality, an **optimum location** is a **relative term**.


GLOBAL COAL DISTRIBUTION
Coal areas of known or inferred extent
Reported occurances of small extent
Taimyr Basin
Tunguska Basin
Northern Alaska Area
Kansko-Achinsk Basin
Sechwan Basin
Great Plains Province
Eastern Region Interior Province
Appalachian Basin
Gulf Coast Province
Guasare Region
Upper Amazon Basin
Magallanes Region
Lower Rhine-Westphalian Basin
Dnieper-Donetsk Basin
Pechora Basin
Kuznetsk Basin
Adopted from Landis and Weaver, 1993, "Hydrocarbons From Coal," AAPG.
Areas are approximate. Basins labeled contain >200 billion tonnes.

Thank You