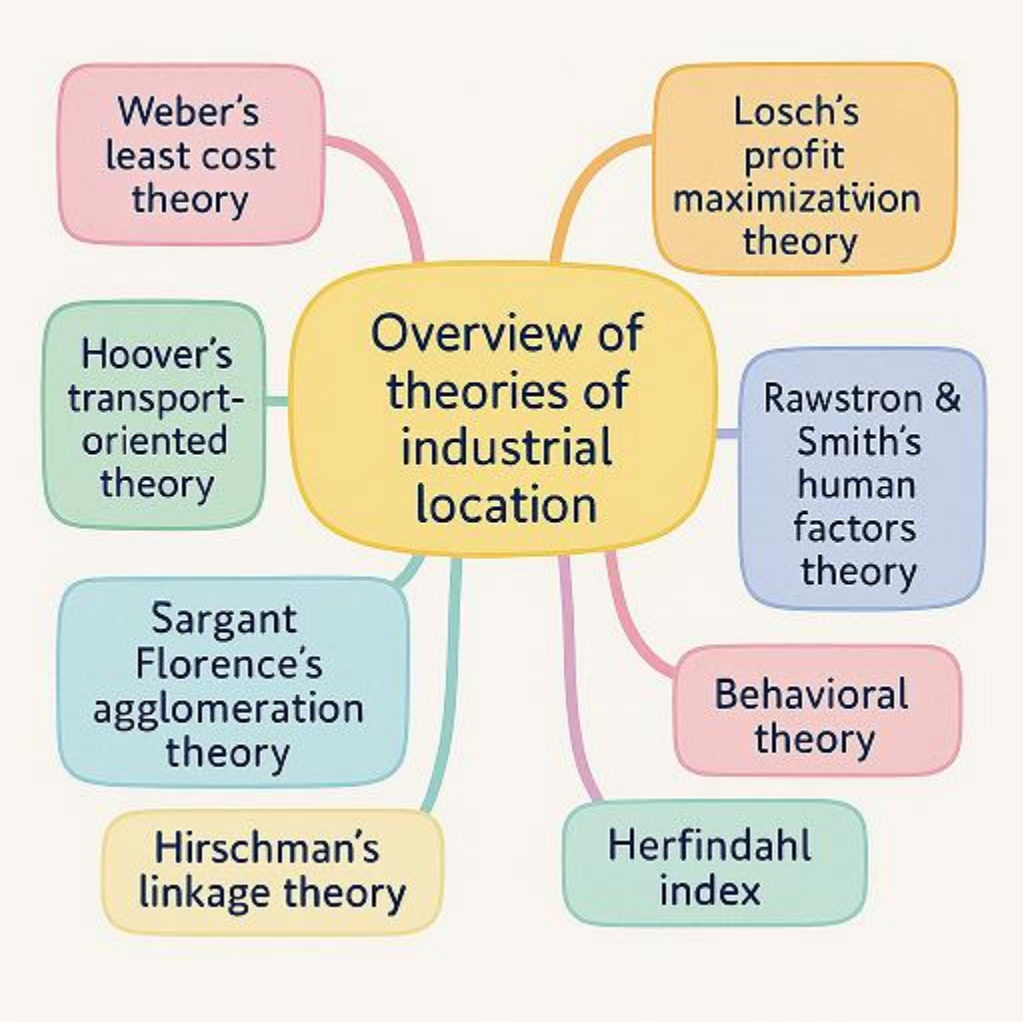
Unit-II: Theories of Location

Theories of Industrial Location- Weber-Sargant Florence-Factors affecting location-Localization-Globalization of Industries-Decentralization of industries –Industrial efficiency and economic efficiency-Measures of concentration-concentration ratio –Hirchman-Herfindahl Index.



Theories of Industrial Location

Industrial location theories aim to explain why industries are established in specific geographic locations. These theories consider various factors such as transportation costs, labor availability, market access, natural resources, human behavior, and institutional influences. Economists and geographers developed these models to understand how businesses minimize costs, maximize profits, and benefit from agglomeration (clustering of firms). Over time, these theories have evolved to include behavioral, human, and institutional aspects, providing a comprehensive view of industrial decision-making.

Theory	Key Concept	Short Details
Weber's Least Cost Theory	Industrial Location	Industry locates where transport and labor costs are minimized.
Losch's Profit Maximization Theory	Market Area & Profit	Firms locate to maximize profit by balancing costs and market size.
Hoover's Transport-Oriented Theory	Transport & Location	Location depends on minimizing transport costs to markets and resources.
Sargant Florence's Agglomeration Theory	Industry Clustering	Industries benefit from clustering due to shared services and efficiency.
Rawstron & Smith's Human Factors Theory	Human Resources	Location influenced by labor availability, skills, and preferences.
Behavioral Theory	Decision Behavior	Emphasizes real human behavior in economic decisions over pure logic.
Institutional Theory	Role of Institutions	Economic activity shaped by laws, norms, and institutions.
Hirschman's Linkage Theory (Optional)	Sector Linkages	Growth spreads through forward and backward linkages between sectors.
Herfindahl Index	Market Concentration	Measures how concentrated or competitive an industry is.

Weber Theories of location

Weber's Theories of Location also called the Least Cost Theory were developed by Alfred Weber in 1909. His theory explains where industries should locate in order to minimize production costs and maximize profit**.**

Main Factors in Location Decision

A. **Transportation Cost**

- Industries want to reduce the cost of moving raw materials to the factory and finished goods to market.
- If raw material is heavy or bulky**,** industry is located near the source**.**
- If finished product is fragile, perishable or heavier, industry locates near the market**.**

Examples:

- **Sugar mills** near sugarcane fields (raw material oriented).
- **Cold drink companies** near urban areas (market-oriented).
- **Cement factories** near limestone quarries.

B. Labor Cost

- Industries may shift to locations where **wages are lower** and **labor is more available**.
- This applies especially to **labor-intensive industries** like textiles, garments, and electronics assembly.

Examples:

- **Garment factories** in Bangladesh due to cheap labor.
- **Electronic component assembly** in Vietnam and India.

C. Agglomeration Economies

- Industries **cluster together** to share infrastructure, suppliers, labor pool, and services.
- Leads to reduced costs and innovation through proximity.

Examples:

- **Silicon Valley** for tech companies.
- **Bengaluru (India)** for IT firms.
- **Tiruppur (Tamil Nadu)** for textiles and hosiery.

3. Other Supporting Factors

Material Index (MI)

- A ratio used by Weber to decide whether to locate near raw materials or the market:

  MI=Weight of raw materials / Weight of finished product

- **If MI > 1 → locate near raw material**
- **If MI < 1 → locate near market**

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- These are **contour lines** showing **equal transport costs** from various points to a central location.
- Helps determine the **optimum industrial site** if labor or other cost factors are added.

Assumptions of Weber's Theory

1. **Isotropic Surface**: The geographical area is flat and uniform with no variation in terrain or climate.
2. **Single Product & Single Market**: The firm produces only one type of product and sells it in one central market.
3. **Fixed Raw Material Locations**: The sources of raw materials are fixed and immobile.
4. **Two Types of Raw Materials**:
   - **Ubiquitous**: Found everywhere (like water)
   - **Localized**: Found only in specific locations (like coal)

5. **Rational Behavior**: Entrepreneurs make purely rational decisions to minimize total cost.

6. Transport **Cost is Proportional**: Transportation cost depends only on **distance** and **weight**; other factors are ignored.

7. **Perfect Competition**: All firms operate under perfect market conditions without monopolies.

8. **Infinite Labor Supply**: There is enough labor available, but at fixed locations with fixed wage rates.

9. **No Government Influence**: No taxes, subsidies, trade restrictions, or regulations affect the location decision.

10. **Static Conditions**: The model assumes that conditions (like technology, demand, and prices) do not change over time.

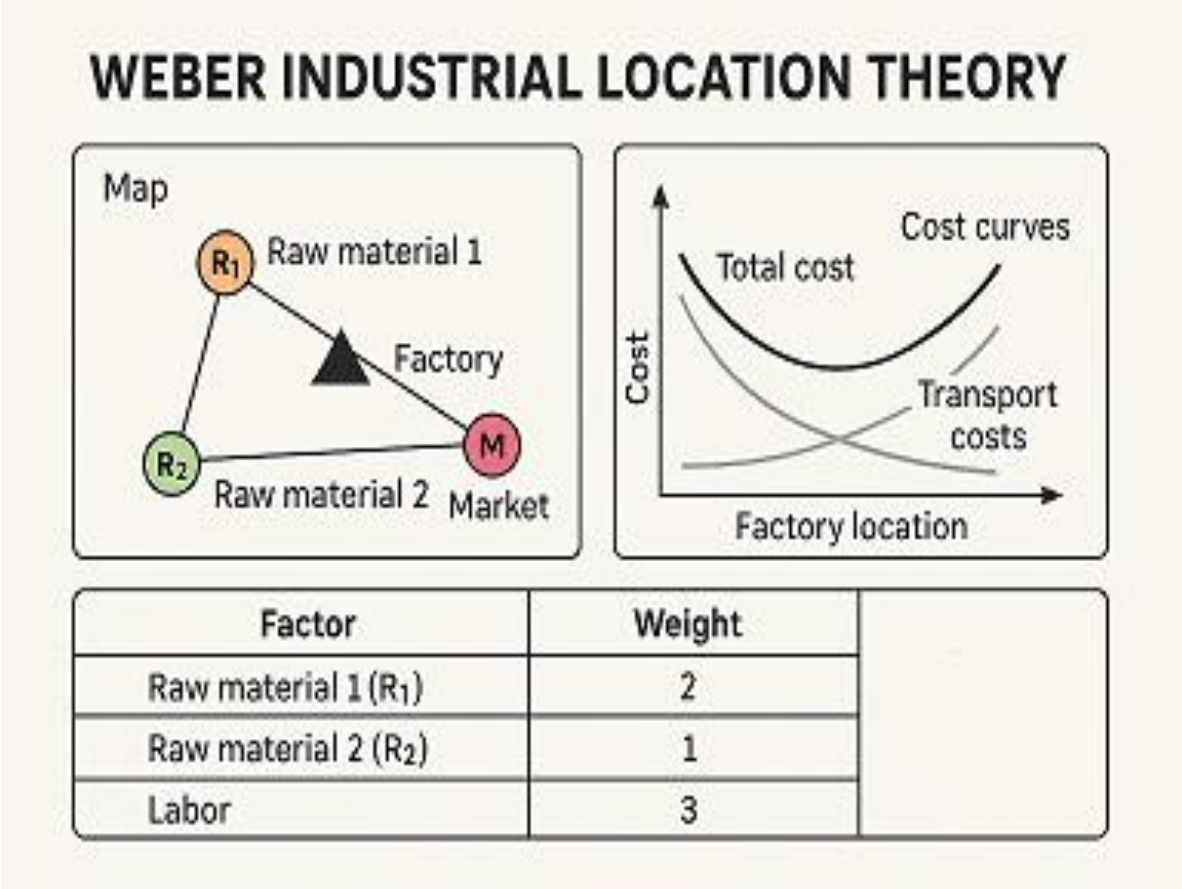
Limitations of Weber's Theory

1. **Too Simplistic**: The real world is not flat or uniform; terrain, climate, and infrastructure vary.
2. **Ignores Government Policies**: Modern location decisions are influenced by tax benefits, SEZs, and subsidies.
3. **Technology Ignored**: Advances in communication and transport reduce the importance of distance.
4. **Not Suitable for Service Industry**: The theory focuses on manufacturing; it doesn't apply well to service or digital businesses.
5. **Labor Mobility Ignored**: Assumes labor is fixed in place, but in reality, workers migrate.
6. **Consumer Demand Not Considered**: Assumes a single market rather than multiple, changing consumer bases.
7. **Static Model**: Cannot explain dynamic shifts like globalization or industrial relocation.

8. **Environmental and Social Factors Ignored**: Factors like pollution, public opinion, or CSR are absent.
9. **Only Cost-Based**: Profit maximization involves not only cost reduction but also market access, brand, and innovation.
10. **Agglomeration Overstated**: Benefits of clustering may lead to crowding, high land costs, and competition, which are not accounted for.

Real World Examples

Industry	Location Decision Based On	Example
Cement Factory	Near raw materials (limestone)	Andhra Pradesh limestone belts
Cold Drinks	Near urban market	Coca-Cola plants in major cities
IT Industry	Agglomeration & labor availability	Bengaluru, Hyderabad
Cotton Textile	Cheap labor	Tiruppur, Bangladesh
Steel Industry	Near iron ore and coal mines	Bokaro, Durgapur (India)



Factor	Weight
Raw material 1 (R_1)	2
Raw material 2 (R_2)	1
Labor	3

1. Weber's theory explains how industries choose factory locations to minimize total cost and maximize profit**.**

2. The three major cost factors considered are transport cost**,** labor cost, and agglomeration benefits**.**

3. The triangle in the diagram shows the positions of:

- **R_1** (Raw Material 1)
- **R_2** (Raw Material 2)
- **M** (Market)
- **Factory** (located between them)

4. The factory is placed at a point that reduces total transportation cost both for bringing raw materials in and sending finished goods to market.

5. If raw materials are heavy or lose weight during production, the factory is located closer to the raw material source.

6. If the finished product is heavier, the factory is located closer to the market.

7. The cost curve in the diagram shows how total changes cost as the location of the factory shifts.

8. The lowest point on the total cost curve shows the ideal location where the combination of transport and labor costs is minimum**.**

9. The factor weight table explains how much influence each input has:

- R_1 has a weight of 2
- R_2 has a weight of 1
- Labor has a weight of 3 (most important in this case)

10. Since labor has the highest weight, the factory may shift toward a low labor cost area, even if it slightly increases transport costs.

11. The whole diagram shows how a business balances transport cost, labor cost, and material weight to choose the most cost effective location.

Sargant Florence's Location Theory of Industrial Location

Developed by **Sargant Florence**, a British economist, in the early 20th century. A response to classical location theories (like Weber's) which emphasized cost minimization. Florence's theory focuses on **industrial agglomeration** (clustering) and **economic efficiency** rather than just transport costs.

Key Concepts

1. **Location Quotient (Location Factor):**
    - Measures how concentrated a specific industry is in a region compared to the national average.
    - Calculated as the ratio of local employment in the industry to total local employment, divided by the same ratio at the national level.

- A value greater than 1 indicates regional specialization.

2. **Coefficient of Localization:**
    - Measures the degree of industrial clustering based on the workforce size within a specific industry.
    - It reflects how much of the industry's workforce is concentrated in one or a few regions.
3. **Agglomeration Economies:**
    - Benefits firms gain by locating close to each other, such as shared infrastructure, labor pools, and knowledge exchange.
    - These economies reduce costs and enhance productivity.
4. **Population and Labor Availability:**
    - A major determinant of industrial location, emphasizing the importance of the local labor market.
    - Industrial clustering tends to occur where sufficient skilled or unskilled labor is available.
5. **Employment Patterns:**
    - Florence used employment data as the primary indicator of industrial presence and strength.
    - Statistical employment distribution helps to map industrial clusters more accurately.
6. **Industrial Specialization:**
    - Certain regions develop specific industrial profiles due to historical, demographic, or economic reasons.
    - Location quotient helps to quantify such specialization.
7. **Inductive Method:**
    - Unlike deductive theories that start from assumptions, Florence's method starts from observed data.

- This makes his theory more descriptive and grounded in reality.

8. **Regional Economic Geography:**
    - His tools provide insights into how industries distribute across regions geographically.
9. **Focus on Workforce Size:**
    - Measures industrial clustering by workforce concentration rather than output or revenue.
10. **Statistical Foundation:**
    - His work laid the groundwork for empirical industrial location analysis, still used in modern regional studies.

Advantages of Florence's Theory

1. **Data-Driven Approach:**
    - Based on real statistical data, making it more accurate in reflecting actual industrial patterns.
2. **Quantitative Tools:**
    - Introduced location quotient and coefficient of localization, which are still widely used in regional planning.
3. **Empirical Insights:**
    - Provided concrete evidence of industrial clustering rather than relying on theoretical models alone.
4. **Focus on Labor and Population:**
    - Recognized the central role of labor availability and population distribution in industry location.
5. **Foundation for Regional Science:**
    - His work contributed significantly to the development of regional science as an interdisciplinary field.

6. **Applicable to Policy:**
    - Helps policymakers identify industrial concentrations and target regional development.
7. **Understanding Agglomeration:**
    - Highlighted the importance of agglomeration economies in explaining industrial location.
8. **Clear Measurement:**
    - The indices give clear, numerical measures of localization, enabling easy comparison across regions.
9. **Versatility:**
    - Can be applied across various industries and geographical scales.
10. **Enhanced Economic Geography:**
    - Improved the empirical study of economic geography through better data use.

Criticisms of Florence's Theory

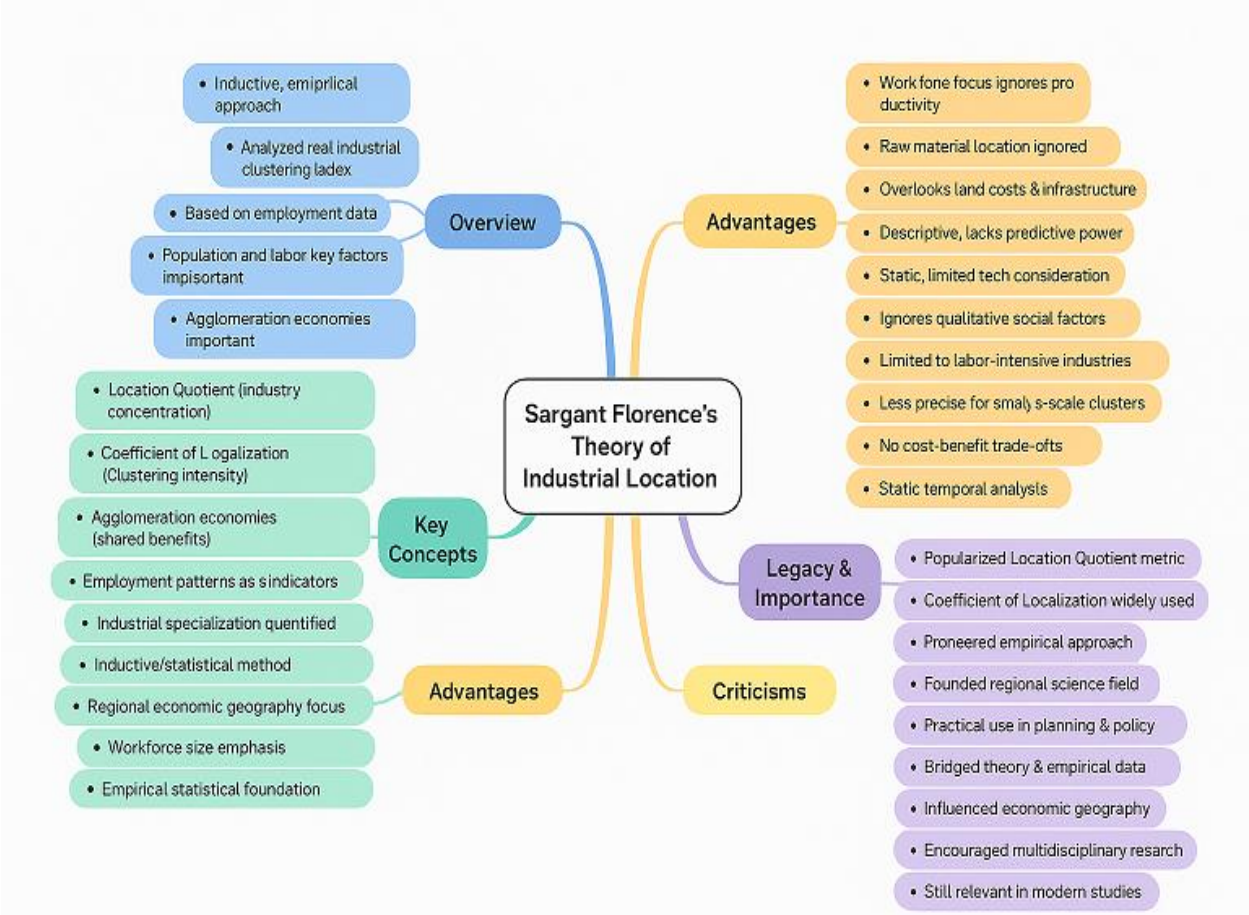
1. **Workforce Focused:**
    - Relies heavily on workforce size and ignores **productivity, output, or profit levels** of industries.
2. **Neglect of Raw Materials:**
    - Does not consider the role of **raw material availability** and proximity, which can be crucial for many industries.
3. **Ignores Land Costs and Infrastructure:**
    - Overlooks local factors such as land prices, transport infrastructure, and utilities that influence location.
4. **Descriptive, Not Predictive:**
    - Mainly analyzes existing industrial distribution but does not offer guidance for future optimal locations.

5. **Limited Consideration of Technological Change:**
    - Assumes static relationships and does not fully account for how technology may change location dynamics.
6. **Overlooks Qualitative Factors:**
    - Neglects cultural, social, and political factors that may impact industrial location.
7. **Limited Industry Scope:**
    - Best suited for labor-intensive industries; less useful for capital or technology-intensive industries.
8. **Regional Scale Issues:**
    - May not be accurate for very small or highly localized clusters where detailed factors matter more.
9. **No Cost-Benefit Trade-off:**
    - Does not integrate cost-benefit analysis to balance labor availability against transport or raw material costs.
10. **Static Analysis:**
    - Does not account for temporal changes or dynamic shifts in industrial patterns over time.

Importance

1. **Introduction of Location Quotient:**
    - A widely used metric in economic geography and regional planning for measuring industry concentration.
2. **Coefficient of Localization:**
    - Remains an important tool to quantify the intensity of industrial clustering.

3. **Pioneering Empirical Approach:**
    - Shifted industrial location theory towards data and observation-based studies.
4. **Foundation for Regional Science:**
    - His methods contributed to establishing regional science as an interdisciplinary study field.
5. **Practical Application:**
    - Used by planners and policymakers to assess regional industrial strengths and design interventions.
6. **Bridging Theory and Practice:**
    - Florence's work connects empirical social science with industrial and regional planning.
7. **Influence on Economic Geography:**
    - His statistical tools helped economists and geographers understand spatial economic patterns.
8. **Encouraged Multidisciplinary Research:**
    - Combined elements of sociology, economics, and geography in industrial location studies.
9. **Continued Relevance:**
    - His localization indices are still included in modern textbooks and regional economic analyses.
10. **Guidance for Future Research:**
    - Laid groundwork that subsequent theories have built upon by integrating cost, technology, and environmental factors.



Factors affecting location

1. Availability of Raw Materials

- Industries often locate near raw material sources to reduce transport costs.
- Especially critical for **resource-based industries** like steel, cement, or sugar.
- Bulky, perishable, or heavy materials make proximity essential.

2. Labor Supply

- Availability of **skilled or unskilled labor** influences location decisions.
- Labor-intensive industries prefer regions with **abundant, low-cost workers**.
- Specialized industries may choose areas near **technical institutions** or cities.

3. Transportation Facilities

- Good **road, rail, port, or air connectivity** lowers input/output logistics costs.
- Industries seek **easy access to markets and suppliers**.
- Inland vs. port location can depend on export-import needs.

4. Power and Energy Availability

- Industries need **uninterrupted, reliable power supply** (electricity, gas, coal).
- Energy-intensive industries like aluminum or chemicals locate near **power hubs**.
- Availability of renewable energy is also becoming relevant today.

5. Market Proximity

- Locating near consumers reduces **distribution costs and delivery time**.
- Essential for **perishable goods**, fashion, and service-based manufacturing.
- Urban regions attract industries selling directly to the public.

6. Infrastructure and Facilities

- Availability of **industrial estates**, warehousing, water, waste disposal, etc.
- Modern infrastructure boosts **efficiency and attractiveness** of a location.
- Includes internet, banking, and housing for employees.

7. Capital and Financial Support

- Proximity to **financial institutions**, investors, or government support.
- Startups and industries often choose regions with **easy access to credit**.
- Subsidies and tax benefits offered in industrial zones affect decisions.

8. Government Policies

- Special Economic Zones (SEZs), tax holidays, or investment incentives.
- Environmental regulations may restrict industries in some areas.
- Licensing policies, land acquisition rules, and clearances also matter.

9. Agglomeration Economies

- Benefits from being close to other businesses:
    - **Shared services**, **common suppliers**, **labor pool**, and **technology exchange**.
- Seen in industrial clusters (e.g., IT in Bengaluru, textiles in Tiruppur).
- Leads to **cost savings and innovation**.

10. Environmental and Social Factors

- Pollution-sensitive industries locate away from dense population areas.
- Public protests or land rights can delay industrial setup.
- Climate, natural hazards, and quality of life for employees also count.

Localization of Industries

Definition:

Localization refers to the **geographical concentration** of similar or related industries in a particular area or region to benefit from shared resources, labor, and infrastructure.

Key Points

1. **Industrial Cluster Formation:**
    - Similar industries set up in the same region.
    - Example: **Tiruppur in Tamil Nadu** – famous for cotton knitwear and textiles; thousands of units operate together.
2. **Economies of Scale:**
    - Sharing services (transport, warehouses, security) reduces average production cost.
    - Example: **Ludhiana's hosiery industry** benefits from bulk raw material purchases and common logistics.
3. **Specialized Labor Pool:**
    - Skilled workers are available locally due to training and experience in that specific industry.
    - Example: **Surat, Gujarat** – known for diamond cutting; workers are trained over generations.
4. **Common Infrastructure:**
    - Industries share power plants, water supply, telecommunication, and even maintenance services.
    - Example: **NOIDA industrial hub** – shared IT parks and tech parks.
5. **Proximity to Raw Materials:**
    - Saves transport cost and time.

- Example: **Jamshedpur (Jharkhand)** – Tata Steel located near coal and iron ore mines.

6. **Access to Markets:**
    - Products reach customers quickly, especially urban populations.
    - Example: **Agra's leather industry** thrives due to its proximity to Delhi and NCR.
7. **Knowledge and Innovation Spillover:**
    - Firms exchange ideas, techniques, and innovations, which improves productivity.
    - Example: **Bengaluru's tech industry** – companies and startups benefit from shared expertise.
8. **Support Services:**
    - Easy access to banking, repair shops, spare parts, and legal/consulting services.
    - Example: **Pune's automobile cluster** has a dense network of component suppliers and service providers.
9. **Brand Identity of Region:**
    - Region becomes synonymous with a product, increasing global demand.
    - Example: **Kanchipuram for silk sarees** – globally recognized as a premium brand.
10. **Challenges of Overconcentration:**

- High land costs, congestion, pollution, and excessive dependency.
- Example: Pollution and traffic issues in **Delhi NCR industrial belts**.

Glocalization of Industries

Definition:

Glocalization is the strategy where global companies **adapt their products, marketing, and operations** to suit the **local culture, preferences, and market conditions**. It combines **"Global Reach" with "Local Fit."**

Key Points

1. **Think Global, Act Local:**
    - Company maintains a global identity but tailors its strategy to local needs.
    - Example: **Starbucks in India** – retains global image but offers masala chai and Indian snacks.
2. **Product Adaptation:**
    - Products are modified to suit local tastes, language, religion, or climate.
    - Example: **McDonald's India** – offers **McAloo Tikki** and **no beef or pork** items.
3. **Cultural Sensitivity in Marketing:**
    - Ads and branding respect local traditions, festivals, and languages.
    - Example: **Coca-Cola India** – uses celebrities in regional languages for ads during Diwali or Pongal.
4. **Hybrid Business Strategy:**
    - Combines global technology and efficiency with local responsiveness.
    - Example: **Toyota** – uses Japanese production techniques but builds cars suited to Indian roads.
5. **Customized Pricing and Packaging:**
    - Local affordability and utility affect design.

- Example: **Unilever** sells shampoo in ₹1 sachets in rural India to match buying capacity.

6. **Localization of Supply Chain:**
   - Using local suppliers, vendors, and factories supports the domestic economy.
   - Example: **PepsiCo India** – procures potatoes from Indian farmers for Lays chips.
7. **Hiring Local Talent:**
   - Employing locals builds trust and increases acceptability.
   - Example: **Infosys or IBM** in India hire locally for their Indian branches.
8. **Regulatory Compliance and Local Laws:**
   - Adapting to labor laws, environmental norms, and local taxation policies.
   - Example: **Amazon India** had to modify logistics due to FDI regulations in multi-brand retail.
9. **Boosts Local Development:**
   - Investment in infrastructure, education, and health by foreign companies improves local communities.
   - Example: **Microsoft's Digital India partnership** supports digital literacy in rural India.
10. **Challenges in Glocalization:**

- Conflict between global brand image and local values or costs.
- Example: **Zara** had to revise clothing designs that unintentionally disrespected cultural sentiments in various countries.

Measures of concentration

What is meant by "Measures of Concentration"?

Industrial concentration refers to the degree to which a small number of firms dominate total production, employment, or sales in an industry. Measures of concentration help us understand the market structure—whether it is competitive, monopolistic, or oligopolistic.

1. Concentration Ratio (CR)

Definition:

The Concentration Ratio (CR) measures the total market share held by the top 'n' firms (usually 4 or 8) in a particular industry. It is expressed as a percentage.

Example:

If the top 4 car manufacturers hold market shares of 30%, 25%, 15%, and 10%, the CR4 = 30+25+15+10 = **80%**

Advantages of Concentration Ratio

1. **Simple to Calculate:** Only requires market share data of the top n firms.
2. **Easy to Understand:** Straightforward sum of market shares.
3. **Quick Market Snapshot:** Shows dominance of largest firms clearly.
4. **Widely Used:** Commonly used in industry reports and competition analysis.
5. **Good for Oligopoly Detection:** Identifies when few firms dominate.
6. **Data Readily Available:** Market shares of top firms are often public.
7. **Useful for Regulation:** Helps regulators identify potential monopolies.
8. **Flexible:** Can adjust number of firms (n) based on industry size.
9. **Cost-effective:** Requires less detailed data than other measures.
10. **Helps in Trend Analysis:** Track market concentration changes over time.

Limitations of Concentration Ratio

1. **Ignores Smaller Firms:** Only focuses on top n firms.

2. **No Distribution Detail:** Doesn't show how market shares are distributed among top firms.
3. **Arbitrary Cut-off:** Choice of n firms can bias results.
4. **Insensitive to Market Fragmentation:** Could miss high concentration if many firms outside top n hold large shares.
5. **Static Snapshot:** Doesn't reflect dynamic competition or entry/exit.
6. **No Scale Sensitivity:** Same CR can represent very different market structures.
7. **Cannot Detect Collusion:** CR doesn't indicate cooperative behavior.
8. **May Overstate Concentration:** When top firms have similar shares, actual competition may be higher.
9. **No Weighting for Firm Size Differences:** A firm with 30% and 29% considered similarly as two firms with 15% each.
10. **Limited in Complex Markets:** Not suitable for markets with many medium-sized players.

Example for CR Limitations:

If top 4 firms have shares 30%, 25%, 15%, and 10%, CR4 = 80%. But if these 4 firms have equal shares (20% each), CR4 is also 80%, though competition is stronger in the latter case.

Pros and Cons Table for Concentration Ratio (CR)

Pros	Cons
Easy and quick calculation	Ignores smaller firms
Clear market dominance snapshot	Arbitrary choice of number of firms
Widely accepted in industry analysis	Does not show share distribution
Requires less data	Static, not dynamic
Good for regulatory and policy use	Cannot detect collusion

Pros	Cons
Flexible in firm number selection	May overstate concentration
Data usually publicly available	No weighting of firm sizes
Helps track trends over time	Insensitive to fragmentation
Cost-effective	Limited for complex markets
Useful for identifying oligopolies	No info on competitive behavior

2. Hirschman-Herfindahl Index (HHI)

Definition:

HHI is calculated by squaring the market share of each firm and summing the results. It ranges from close to 0 (many small firms) to 10,000 (pure monopoly).

Example:

If market shares are 40%, 30%, 20%, and 10%: HHI = $40^2 + 30^2 + 20^2 + 10^2 = 1600 + 900 + 400 + 100 =$ **3000**

Advantages of HHI

1. **Considers All Firms:** Accounts for the entire market, not just top firms.
2. **Weighted Measure:** Squares market shares, giving more weight to larger firms.
3. **Sensitive to Market Structure:** Reflects dominance better than CR.
4. **Ranges from 0 to 10,000:** Easy to interpret concentration scale.
5. **Widely Used in Antitrust:** Used by governments for merger evaluation.
6. **Captures Market Power More Accurately:** Highlights the effect of big players.
7. **Comparative:** Can compare concentration across industries or countries.
8. **Reflects Small Firm Influence:** Even small firms impact the index.

9. **Quantitative:** Can be plugged into economic models easily.
10. **Monotonic:** Any increase in one firm's share increases HHI.

Limitations of HHI

1. **Complex Calculation:** Needs market shares of all firms.
2. **Data Intensive:** Difficult to get complete data in some markets.
3. **Less Intuitive:** Squared shares may confuse non-experts.
4. **Not Always Transparent:** Difficult to explain to stakeholders.
5. **Ignores Non-Market Factors:** Like product differentiation or barriers to entry.
6. **Sensitive to Small Changes:** Small shifts in share can disproportionately affect HHI.
7. **Static Snapshot:** Doesn't capture market dynamics over time.
8. **Ignores Collusion and Pricing Power:** Only reflects market shares.
9. **May Understate Competition:** If many firms compete vigorously despite concentration.
10. **Difficult for Fragmented Markets:** Low HHI may hide dominant firms in niches.

Example for HHI Limitation:

If a firm with 40% market share loses 1%, HHI decreases by 80 points (because $40^2=1600$, $39^2=1521$). This small change may seem large and overstate volatility.

Pros and Cons Table for Hirschman-Herfindahl Index (HHI)

Pros	Cons
Accounts for all firms' market shares	More complex to calculate
Gives greater weight to larger firms	Data on all firms may be unavailable
Sensitive and accurate market concentration	Less intuitive to understand

Pros	Cons
Used widely in merger and antitrust review	Difficult to explain to non-experts
Quantitative and comparable across markets	Ignores product differentiation
Captures small firm influence	Sensitive to small share changes
Reflects monopoly power well	Static snapshot, no dynamics
Provides continuous scale from 0 to 10,000	Does not show collusion or pricing power
Useful for regulatory and economic models	May understate competition in some cases
Monotonically increases with firm share	Low HHI can mask niche dominance