What Is Industry?

• Many people think of industry as the collective large-scale **manufacturing** of goods in well-organized plants with a high degree of automation and specialization.

• Although this is a common example of industry, it can also include other commercial activities that provide **goods** and **services** such as agriculture, transportation, hospitality, and many others.
What Is Industry?

- Industry refers to an economic activity that is concerned with production of goods, extraction of minerals or the provision of services.
Sectors of Industry

Industries can be classified into private sector, public sector (state owned), and joint sector.

- **Private sector** industries are owned and operated by individuals or a group of individuals.
- **Public sector** industries are owned and operated by the government.
- **Joint sector** industries are owned jointly by the government and private individuals.
Factors Affecting Industry Location

The factors affecting the location of industries are the availability of raw material, land, water, labor, power, capital, transport and market.

• Industrial regions emerge when a number of industries locate close to each other and share the benefits of their closeness.

• An industrial system consists of inputs, processes and outputs. Inputs include raw materials, land, capital, labor, entrepreneurship, transport, power and other infrastructure.
An Industrial System (Value Added)

- Material
- Land
- Capital
- Labor

Transformation Process

- Goods
- Services
## Food Processing

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Processing</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Vegetables</td>
<td>Cleaning</td>
<td>Canned Vegetables</td>
</tr>
<tr>
<td>Metal Sheets</td>
<td>Making Cans</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>Cutting</td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td>Cooking</td>
<td></td>
</tr>
<tr>
<td>Labor</td>
<td>Packing</td>
<td></td>
</tr>
<tr>
<td>Building Equipment</td>
<td>Labeling</td>
<td></td>
</tr>
</tbody>
</table>
## Hospital Process

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Processing</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctors &amp; Nurses</td>
<td>Examination</td>
<td>Healthy Patients</td>
</tr>
<tr>
<td>Hospital</td>
<td>Surgery</td>
<td></td>
</tr>
<tr>
<td>Medical Supplies</td>
<td>Monitoring</td>
<td></td>
</tr>
<tr>
<td>Equipment</td>
<td>Medication</td>
<td></td>
</tr>
<tr>
<td>Laboratories</td>
<td>Therapy</td>
<td></td>
</tr>
</tbody>
</table>
Production of Goods vs. Delivery of Services

• Production of goods – tangible output
• Delivery of services – an act
• Service job categories
  ➢ Government
  ➢ Wholesale/retail
  ➢ Financial services
  ➢ Healthcare
  ➢ Legal services
  ➢ Shipping services
  ➢ Education
# Manufacturing vs. Services

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Manufacturing</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>Tangible</td>
<td>Intangible</td>
</tr>
<tr>
<td>Customer contact</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Uniformity of input</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Labor content</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Uniformity of output</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Measurement of productivity</td>
<td>Easy</td>
<td>Difficult</td>
</tr>
<tr>
<td>Opportunity to correct quality problems</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>
World Major Industries

• Examples of the world’s major industries include iron and steel industry, textile industry and information technology industry.
  • Iron and steel industry is a feeder industry whose output (e.g. metal sheets) are used as inputs for other industries (e.g. canned vegetables).

• Germany, USA, China, Japan and Russia are of the major countries in which iron and steel industry is located.

• Textile industry is concentrated in India, Hong Kong, South Korea, Japan and Taiwan.
Information Technology

• The major hubs of Information technology industry are the Silicon Valley (SV) of Central California and the Bangalore region of India.

• The information technology industry deals in the storage, processing and distribution of information. Today, this industry has become global. This is due to a series of technological, political, and socio-economic events.
Levels of Industry

Industry can be classified into five levels. The terms for each level originate from Latin words referring to the numbers one to five.
Primary Industries (first):

• Primary industries are those that extract or produce raw materials from which useful items can be made.
• Extraction of raw materials includes mining activities, forestry, and fishing.
• Agriculture is also considered a primary industry as it produces “raw materials” that require further processing for human use.
Raw Materials in Industry

- Industries may be mineral, marine, agro, and forest based depending on the type of raw materials they use.

  - **Mineral based industries** are primary industries that use mineral ores as their raw materials. The products of these industries feed other industries such as Iron and Steel Industry.
  
  - **Marine based industries** use products from the sea and oceans as raw materials. Industries processing sea food or manufacturing fish oil are some examples.
  
  - **Agro based industries** use plant and animal based products as their raw materials. Food processing, vegetable oil, cotton textile, dairy products and leather industries are some examples.
  
  - **Forest based industries** utilize forest produce as raw materials. The industries associated with forests are pulp and paper, pharmaceuticals, furniture and buildings.
Secondary Industries (second):

- Secondary industries are those that change raw materials into usable products through processing and manufacturing.
- Bakeries that make flour into bread and factories that change metals and plastics into vehicles are examples of secondary industries.
- The term “value added” is sometimes applied to processed and manufactured items since the change from a raw material into a usable product has added value to the item.
Tertiary Industries (third):

• Tertiary industries are those that provide essential services and support to allow other levels of industry to function.
• Often simply called service industries, this level includes transportation, finance, utilities, education, retail, housing, medical, and other services.
• Since primary and secondary levels of industry cannot function without these services, they are sometimes referred to as “spin-off” industries. Much of the city of Thompson in Canada, for example, is made up of tertiary or service industries to support the primary industry of mining.
Quaternary Industries (fourth):

- Quaternary industries are those for the creation and transfer of information, including research and training.

- Often called information industries, this level has seen dramatic growth as a result of advancements in technology and electronic display and transmission of information.
Quinary Industries (fifth):

- Quinary industries are those that control the industrial and government decision-making processes.
- This level includes industry executives and management and elected officials in government.
- Policies and laws are made and implemented at this level.
iPhone Example

- Primary – Mining the metal, drilling for oil to create synthetics
- Secondary – Manufacturing the processors, assembling the phone
- Tertiary – Apple Store selling phone
- Quaternary – Software development (app makers)
  - Quinary – the late Steve Jobs (now Tim Cook)

video: https://www.youtube.com/watch?v=343CIAQxwO4&t=2s
Levels of Industries
Types of Industry

- Labor intensive
- Capital intensive
- Energy intensive
- Technology intensive
Production Systems

- **Job Shop**: small scale
- **Batch Production**: moderate volume
- **Repetitive/Assembly Line**: high volume of standardized goods or services
- **Continuous Production**: very high volume of continuous products

Video: http://manufacturing.stanford.edu/
Job Shop

• Examples:
  • Machine Shop
  • Ship Building
  • Construction
  • Barber Shop
Batch Production

• Examples:
  • Bakery
  • Class Rooms
  • Pharmaceuticals
  • Heavy Equipment
Repetitive Production

• Examples:
  • Assembly line
  • Cafeteria Line
  • Car Wash
  • Automobile making
Continuous Production

• Examples:
  • Steel Making
  • Paper Mills
  • Flour Factories
  • Sugar Factories
Industry 4.0: Technological Development

First Industrial Revolution through the introduction of mechanical production facilities with the help of water and steam power

Second Industrial Revolution through the introduction of a division of labor and mass production with the help of electrical energy

Third Industrial Revolution through the use of electronic and IT systems that further automate production

Fourth Industrial Revolution through the use of cyber-physical systems

Degree of complexity

First mechanical loom, 1784

First assembly line Cincinnati slaughter houses, 1870

First programmable logic controller (PLC), Modicon 084, 1969
What is Industry 4.0

A name given to the current trend of automation and data exchange in manufacturing technologies. It includes cyber-physical systems, the Internet of things, cloud computing and cognitive computing. Industry 4.0 is commonly referred to as the fourth industrial revolution that creates what has been called a "smart factory".

Video:
https://www.youtube.com/watch?v=RPC7yo99Nxs
https://www.youtube.com/watch?v=HPRURtORnis
What is Industry 4.0?
The Fourth Industrial Revolution - Explained
Thank You!