Chapter 3
International Logistics Infrastructure

International Logistics Infrastructure

- Definitions
- Transportation Infrastructure
- Communication Infrastructure
- Utilities Infrastructure
- Services Infrastructure
- Legal and Regulatory Infrastructure

Definitions

Infrastructure is a collective term that refers to all of the elements in place (publicly or privately owned goods) to facilitate transportation, communication, and business exchanges.

Definitions

- The **Transportation Infrastructure** allows goods to move efficiently within a country and between countries. This requires well-maintained seaports, airports, railways, and roads.

- The **Communication Infrastructure** allows businesses to communicate clearly and quickly. This requires reliable phone lines, cell phone networks, internet service, and mail delivery.

- The **Utilities Infrastructure** allows businesses to sustain their daily operations. This requires reliable electricity, energy (natural gas), water, and sewer services.

Definitions

- The **Banking Infrastructure** allows businesses to move funds and documents quickly and reliably, both within a country and between countries. This requires a network of bank branches and well-trained bank employees.

- The **Business Services Infrastructure** allows businesses to find additional competent logistics help quickly. This includes freight forwarders, couriers, carriers, delivery services, packing services, and so on.

- The **Distribution Infrastructure** allows businesses to find agents and distributors, to develop wholesale and retail channels, and promote their products.

Definitions

- The **Court Infrastructure** allows businesses to settle disputes quickly and fairly. This includes not only an efficient court system, but also a network of mediators and arbitrators, and the existence of clear jurisprudence.

- The **Intellectual Property Infrastructure** allows businesses to protect their intellectual property (copyrights, patents, and trademarks) with law enforcement services intent on enforcing intellectual property laws.

- The **Standard Infrastructure** allows businesses to determine the requirements that their products and operations must meet. This includes safety, design, and performance standards.

Transportation Infrastructure

- Ocean and Water Transportation
- Air Transportation
- Railroad Transportation
- Road Transportation
- Other Means of Transportation

Port Infrastructure (I)

- Water Draft

  The depth of water determines the size of ships that can call.

- Air Draft

  Bridge clearances also determine which ships can call.

- Cranes

  Post-Panamax ships need wider/taller cranes than Panamax ships.

- Port Operations

  Many ports have strong unions which limit operations.

Port Infrastructure (II)

- Space Limitations

  The location of most ports limit their ability to expand.

- Warehouse Space

  Availability of reliable storage space for goods in transit.

- Connection to land-based Transportation

  Ports need to have reliable access to roads and/or rail lines to keep cargo moving.

The Port of Santos in Brazil, limited by the growth of the city, and the width of the river
Source: Luis Inácio P Prado

The Port of YangShan was created because the Port of Shanghai did not have enough water draft
Source: Port of Shanghai Authority

The Bayonne Bridge’s Deck was raised from 155 feet (47m) to 215 feet (66m). Port of New York
Source: Arnold Reinhold

Ports must have cranes that can service the mega containerships of today
Source: Canaran

The Alameda Corridor links the Ports of Los Angeles and Long Beach to East LA
Source: Alameda Corridor Transportation Authority

Containerships waiting to be unloaded during the Port of Los Angeles Strike (2015)
Source: Agence France Presse

Canals and Waterways

Maritime transportation is dependent on the existence of reliable canals.

The **Suez Canal** in North Africa and the **Panama Canal** in Central America are particularly important. The current trend of building ships too large to fit through these canals is creating new challenges for the industry.

Other key waterways include the **Bosporus Strait** in Turkey which connects the Black Sea with the Mediterranean and the **Saint Lawrence Seaway** in North America which connect the Great Lakes with the Atlantic Ocean.

Other canals are less frequently used, such as the **Corinth Canal** in Greece.

The “Old Locks” on the Panama Canal
Source: Skip Lewandowski

The New Locks on the Panama Canal
Source: Panama Canal Authority

The Suez Canal in Egypt
Source: Don Victorio

The Bosporus Strait in Istanbul, Turkey
Source: Mehmet Cetin

The Corinth Canal in Greece
Source: Corinth Canal Authority

Airport Infrastructure

- Runways

  The lengths of runways determines whether an airport can handle large cargo planes, and the number of runways determines its capacity.

- Space

  Most airports are landlocked and cannot expand.

- Hours of operation

  Airports need to be located away from of major cities if they are going to operate at night. Many airports do not meet this requirement.

- Warehouse space

  Storage facilities protect cargo from the elements.

The Kai-Tak Airport (Hong Kong) is now closed.
Source:

The new Chek Lap Kok Airport (Hong Kong) was built on an artificial island.
Source: Wylkie Chan

The San Francisco Airport (U.S.) has intersecting runways that interfere with one another.
Source: unknown

The Atlanta Airport (U.S.) has parallel runways that do not interfere with one another.
Source: unknown

The Congonhas (São Paulo, Brazil) has very little warehousing space.
Source: unknown

Railroad Infrastructure

- Gauge

  When railroads were first built, countries installed unique railroad track gauges to prevent rival armies from using them. Today, these gauge differences prevent trains from traveling quickly between multiple countries.

- Multi-modal

  Cargo rail transport has shifted from traditional railcars to multi- modal cars, carrying either containers or truck trailers.

- Land bridges

  Containers are shipped from Asia to Europe through the U.S. railroad network; they arrive in a port on the west coast, and are transported to an east-coast port by rail.

A dual-gauge (mixed-gauge) railroad track in Belarus.
Source: Martyn Jandula

A single-stack train in Spain, limited in height by the electric catenaries.
Source: Oriol Paris Fuste

A double-stack train in Canada.
Source: Patricia Burilli Fencz

A double-stack train under electric catenaries on a high-speed rail line in India.
Source: Indian Railways

Road Infrastructure

- Quality

  The existence of high-quality roadways is important to the continuous flow of goods.

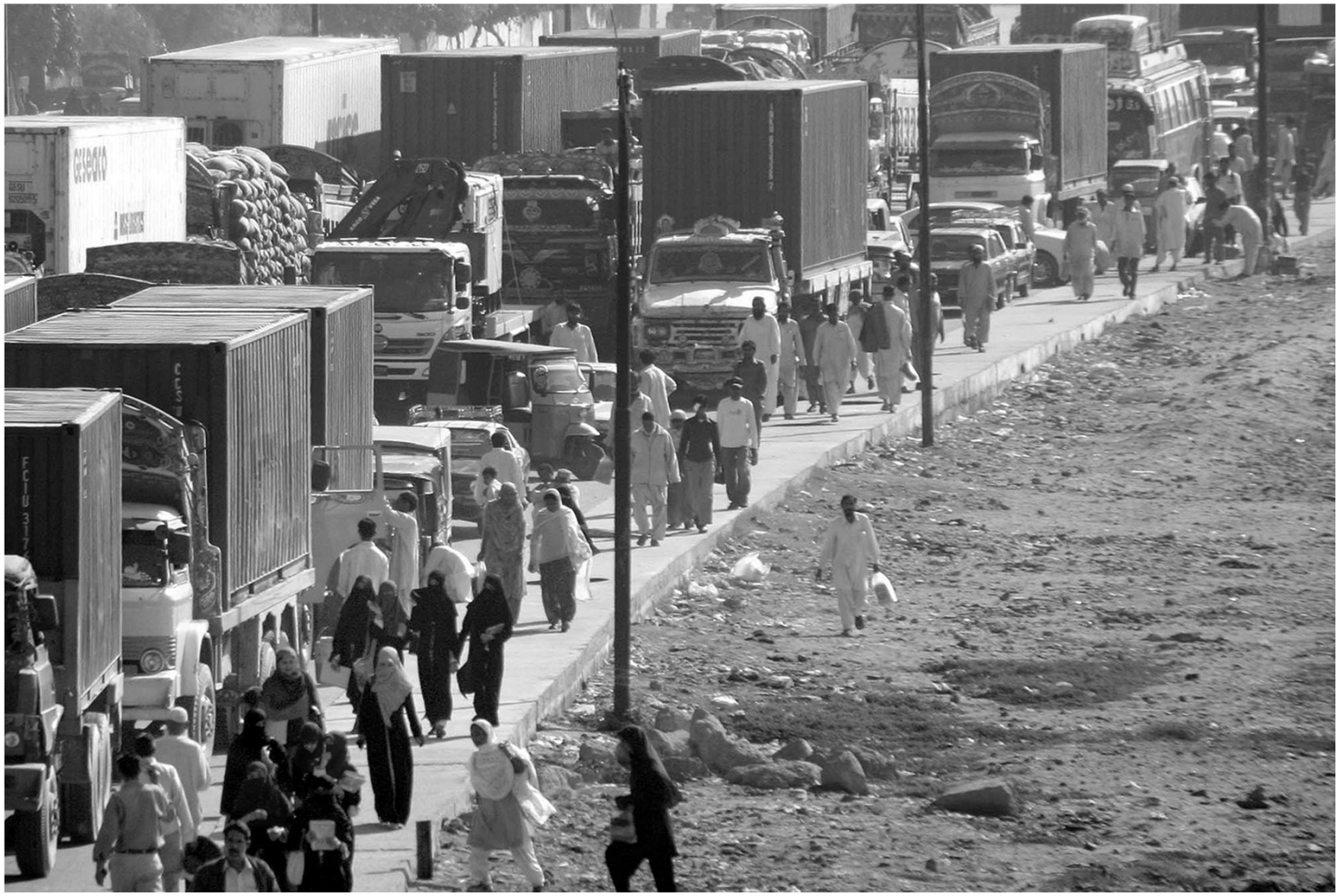
- Congestion

  In many countries traffic congestion is stifling and prevents goods from moving quickly.

- Civil engineering structures

  Structures such as bridges and tunnels need to be built in many places in order to conveniently navigate the landscape.

Russia has a network that includes roads that are close to impassable in rainy weather.
Source: unknown



The traffic congestion on the access road to the Port of Karachi in Pakistan.
Source: Asianet-Pakistan

The Italian Autostrade is a succession of bridges and tunnels.
Source: Digitrend Srl

Communication Infrastructure (Mail)

- Speed

  In some countries, mail delivery is quick. In others, slow, or very slow.

- Reliability

  Some structural issues prevent all mail is delivered.

- Delays

  Strikes can delay the delivery of important documents.

Communication Infrastructure (Mail)

- Competition

  Firms such as FedEx, UPS, and DHL are very reliable, but they are generally much more expensive than the public postal services.

  Local delivery services offer alternatives, but their costs and reliability must be investigated.

  In some countries, they must be used, though, because the mail is too slow or unreliable.

The French mail service uses a high-speed train in which mail is sorted.
Source: mecdepaname

Communication Infrastructure (Telecommunications)

- Land lines

  While some countries have reliable, inexpensive phone lines, others do not have good landline telecommunication networks.

- Cellular phones

  Some countries built cellular phone networks quickly, often because they did not have a good landline network. They leapfrogged the landline technology, often offering better cellular access than developed countries with reliable landline networks.

  The costs of a cell-phone plan can also vary drastically by country.

Landline Penetration

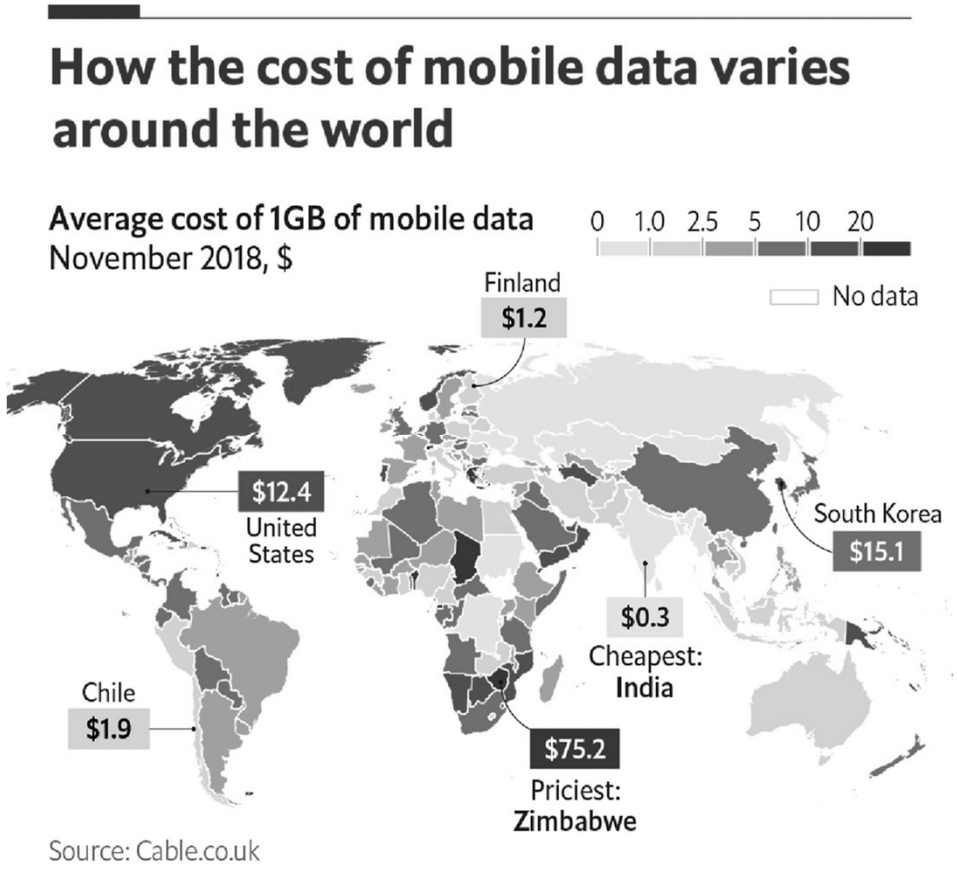
Rank	Country	Percentage	Rank	Country	Percentage
1	France	57.8%	14	Switzerland	35.8%
2	Taiwan	54.5%	15	Ireland	35.8%
3	Hong Kong	54.4%	16	Canada	35.2%
4	Portugal	50.3%	17	United States	32.4%
5	Japan	50.0%	18	Italy	32.4%
6	Germany	48.5%	19	Singapore	32.3%
7	South Korea	48.1%	20	Hungary	31.6%
8	Greece	47.9%			
9	Belarus	47.6%	26	United Arab Emirates	23.8%
10	United Kingdom	47.4%	55	Lithuania	13.5%
11	Spain	42.1%	62	Kuwait	12.3%
12	Austria	41.8%	80	Botswana	6.0%
13	New Zealand	36.6%	92	Thailand	3.7%

Landline Penetration (2020).
Source: CIA's World Factbook

Cell-Phone Penetration

Rank	Country	Percentage	Rank	Country	Percentage
1	Hong Kong	287.8%	14	Estonia	148.1%
2	United Arab Emirates	197.7%	15	El Salvador	145.7%
3	Thailand	185.7%	16	Cyprus	142.2%
4	Kuwait	172.0%	17	Cote d'Ivoire	142.1%
5	Botswana	171.3%	18	Iran	140.8%
6	Lithuania	170.0%	19	Vietnam	140.0%
7	Georgia	166.1%	20	Japan	139.6%
8	Russia	165.6%			
9	South Africa	164.0%	46	Germany	128.6%
10	Turkmenistan	161.1%	61	Taiwan	123.1%
11	Costa Rica	160.1%	62	United States	122.8%
12	Singapore	153.7%	78	Portugal	116.8%
13	Philippines	152.4%	92	France	110.2%

Cell Phones per Capita (2020).
Source: CIA's World Factbook



Cell-Phone Costs (2018).
Source: Cable.co.uk

Communication Infrastructure (Internet Access)

- Access

  In some countries, access to the internet is still limited or cost prohibitive. In others, internet access is widely available and inexpensive.

- Speed

  There can be stark differences in speed as well. While some countries offer fast and inexpensive access through fiber optic lines, others have slow and cumbersome infrastructures.

Internet Penetration

Rank	Country	Percentage	Rank	Country	Percentage
1	Kuwait	97.0%	11	Sweden	90.7%
2	Denmark	96.6%	12	Estonia	90.5%
3	Qatar	96.4%	13	Saudi Arabia	90.4%
4	United Arab Emirates	95.6%	14	Germany	90.1%
5	South Korea	95.1%	15	Canada	89.5%
6	Norway	94.8%	16	Hong Kong	89.0%
7	Bahrain	94.6%	17	Switzerland	88.5%
8	The Netherlands	94.0%	18	Finland	88.3%
9	United Kingdom	94.0%	19	Kosovo	88.3%
10	Taiwan	92.6%	20	New Zealand	88.1%
			24	United States	85.8%

Internet Access per Capita (2020).
Source: CIA's World Factbook

Internet Median Speed (Download)

Rank	Country	Mbps	Rank	Country	Mbps
1	Taiwan	85.0	14	New Zealand	32.7
2	Singapore	70.9	15	Estonia	31.5
3	Sweden	55.2	16	Hong Kong	31.4
4	Denmark	49.2	17	Hungary	31.1
5	Japan	42.8	18	Lithuania	30.7
6	Luxembourg	41.7	19	France	30.4
7	The Netherlands	40.2	20	Slovakia	29.5
8	Switzerland	38.9	21	Finland	29.3
9	Norway	38.5	22	Canada	28.8
10	Spain	36.1	23	Slovenia	27.8
11	Belgium	35.7	24	Germany	24.6
12	United States	32.9	25	Poland	24.4
13	Latvia	32.7	26	Ireland	23.9

Internet Median Download Speed (2019).
Source: Multiple

Utilities Infrastructure

- Electricity

  Unreliable electricity grids and insufficient production capacity can cause blackouts or brownouts, limiting productivity.

- Water and sewer

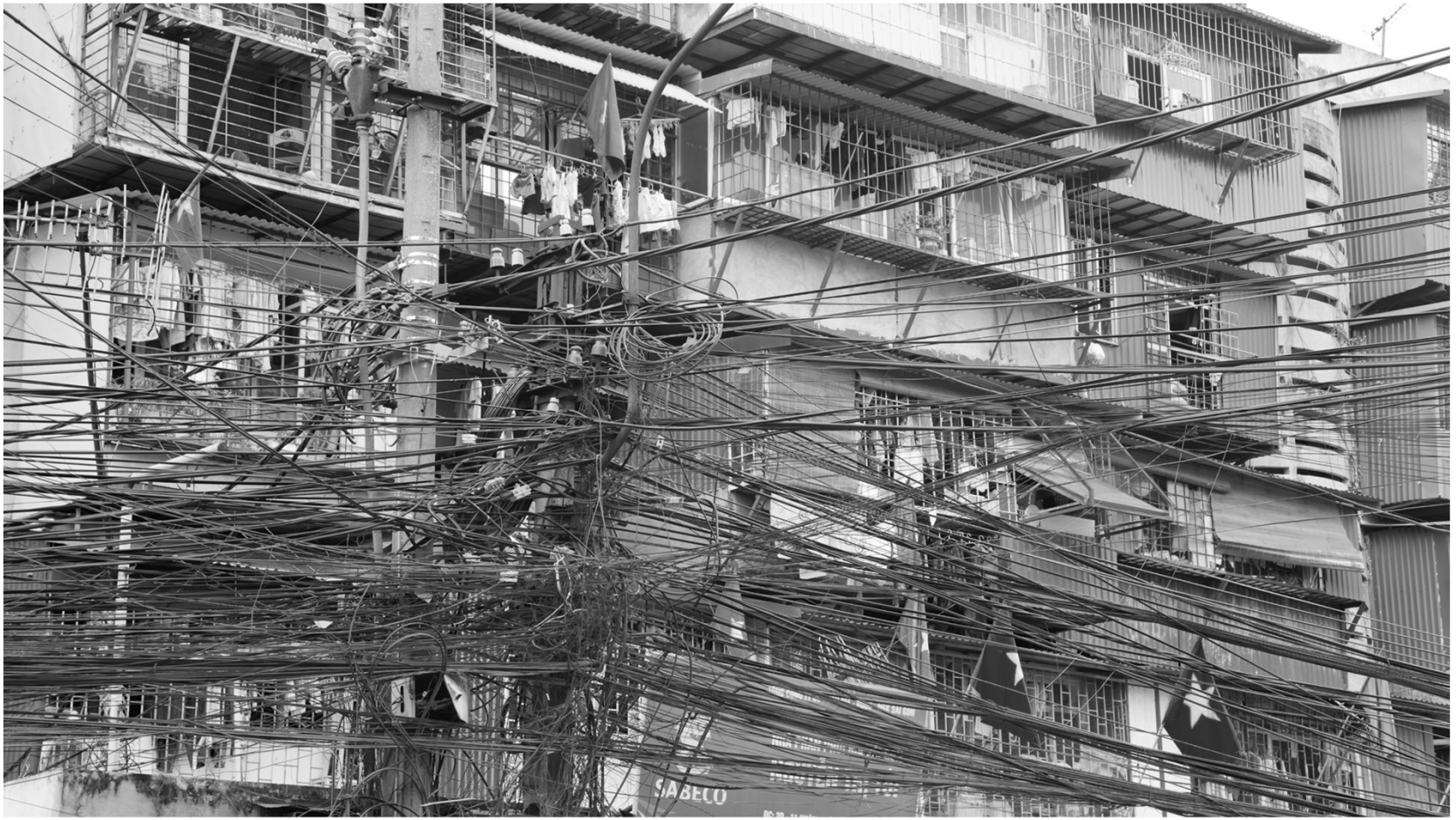
  Access to clean water (and sewer) is fundamentally important for many manufacturing processes.

- Energy

  Reliable pipelines have to be available to deliver natural gas or oil products to the locations where they can be used.

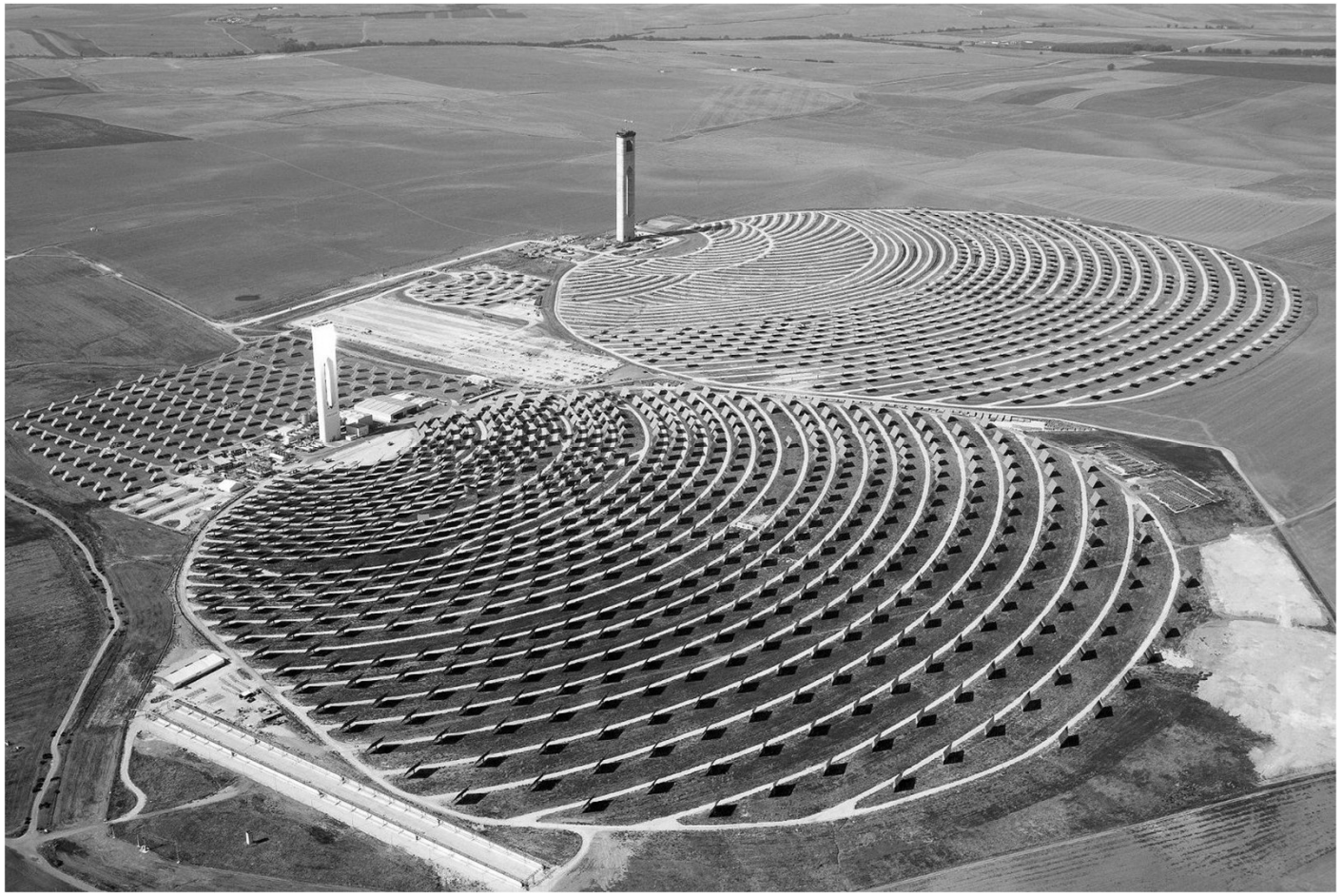
- Theft

  In some areas, theft of utilities is common, making it difficult for utility companies to earn a profit and invest in new infrastructure.



Tangled Power and Telecommunication Lines in Hanoi, Vietnam.
Source: Kagemusha

Nuclear Power Plant in Tihange, Belgium.
Source: engel.ac



The Noor thermal Solar Power Plant in Ouarzazate, Morocco.
Source: Ecohz

An Off-Shore Wind Power Plant in the Netherlands.
Source: unknown

Banking Infrastructure

- Foreign currency payments

  The ability to quickly purchase and sell foreign currencies, either through wire transfers or currency purchases, is important to firms engaged in international trade.

- Methods of payment

  The ability of the banking partners to support alternative means of payment and to provide assistance to firms engaged in international trade is very important.

- Document exchanges

  Banks play a fundamental role in the exchange of trade documents between an exporter and an importer.

Business Services Infrastructure I

- Freight forwarders

  Freight forwarders provide significant assistance to firms engaged in international trade by helping determine the best shipping alternatives.

- Customs brokers

  Brokers provide assistance to importers when clearing Customs.

- Couriers

  Couriers allow firms to ship documents and small parts using the "next available flight."

Business Services Infrastructure II

- Packing services

  Packing services allow exporters to rely on professionals to pack goods destined for export.

Multiple other services

  Carriers, delivery services, etc. are fundamental to implement good international trade practices, and must exist for exporters to be successful.

Distribution Channel Infrastructure

- Agents and distributors

  A strong network of agents and distributors allows an exporter to enter new markets and expand abroad.

- Retail distribution

  Efficient access to consumers is important to a manufacturer of consumer goods, and may not be available in all countries.

Promotion Infrastructure

- Advertising and promotion

  Advertising agencies and media allow promotional activities critical to the success of many products and services.

- Trade shows

  For most industries, trade shows present an unequaled opportunity to reach potential customers and trade partners.

Court Infrastructure

- Speed

  Speedy resolution of lawsuits allows businesses to “move on.” Some countries have slow and cumbersome court processes.

- Arbitration

  Disputes can be resolved faster through arbitration. The existence of experienced arbitrators is important to the conduct of business.

- Mediation

  Disputes can also be resolved through mediation, and therefore a group of mediators is often useful to resolve disputes.

- Fairness

  In some countries, the court system is perceived as corrupt or unfair, and that hinders good business relationships.

Intellectual-Property Infrastructure

- Protection

  Businesses with intellectual property (patents, copyrights, trade secrets) want to make sure that the countries in which they operate will protect intellectual property. In some countries, competitors, police, and courts do not respect nor protect intellectual property, often considering that intellectual property laws favor big foreign corporations over the local entrepreneur trying to earn a living.

- International Agreements

  Some countries have not ratified international agreements on intellectual property and therefore do not recognize some aspects of foreign patents and copyrights.

Standards Infrastructure

- Countries have different standards for products and services offered for sale; these standards are specific and must be followed.
- Safety

  Safety requirements often differ from country to country. Such is the case for vehicles, appliances, and hotels, for example.
- Design

  Product designs are often dictated by local conventions (electrical supply and plugs, plumbing sizes and pressures, and telecommunication standards, for example).
- Performance

  Several countries have performance standards for products, dictating what can be called “natural,” “organic,” “premium,” and so forth.